STEEL
The Magazine of Metalworking and Metalproducing
ESTABLISHED 1882
TECHNOLOGY DEPT.

The WEAN
ENGINEERING COMPANY, Inc. • WARREN, OHIO

SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT

SHELL and SLEEVE LATHE

WILSON TUBE ANNEALING FURNACE

ARMOR PLATE LEVELLER

SLITTER or SIDE TRIMMER
(Combination type)

WEAN-HALLDEN HI-SPEED TIN PLATE SHEARING LINE

ELECTROLYTIC and BONDERIZING TIN PLATE EQUIPMENT

Associated Companies

LEE WILSON ENGINEERING CO.
CLEVELAND, OHIO

FLINN & DREFFEIN CO.
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THE McKAY MACHINE CO.
YOUNGSTOWN, OHIO

THE HALLDEN MACHINE CO.
THOMASTON, CONN.

THE WELLMAN SMITH OWEN ENGR. CORP., LTD.
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THE WEAN ENGINEERING CO. OF CANADA, LTD.
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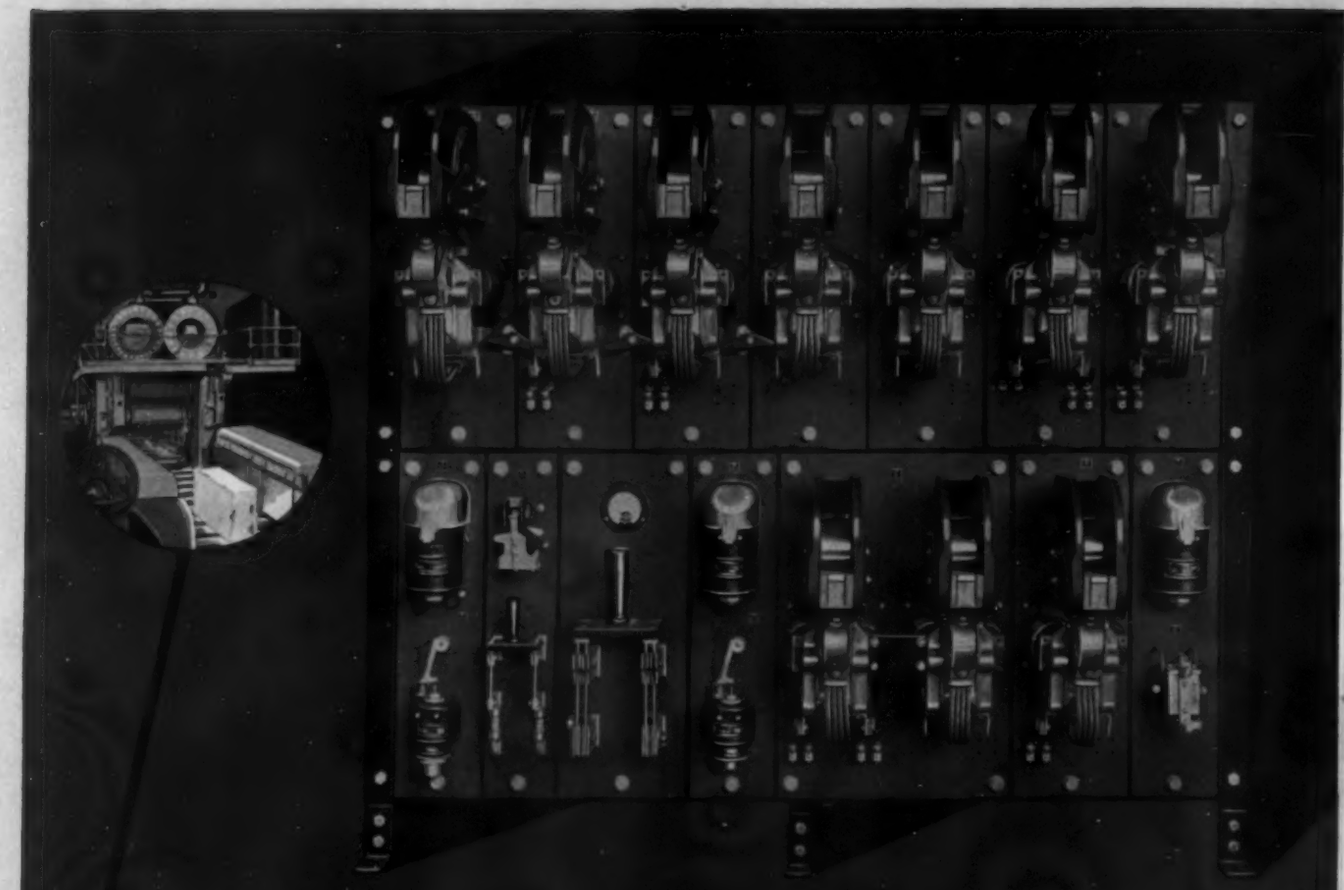
Subsidiary Company
THE BRODEN CONSTRUCTION CO.
CLEVELAND, OHIO

★ SPECIAL MACHINERY for WAR PURPOSES ★



EC&M *LINE-ARC* CONTACTOR RHEOSTATIC CONTROL

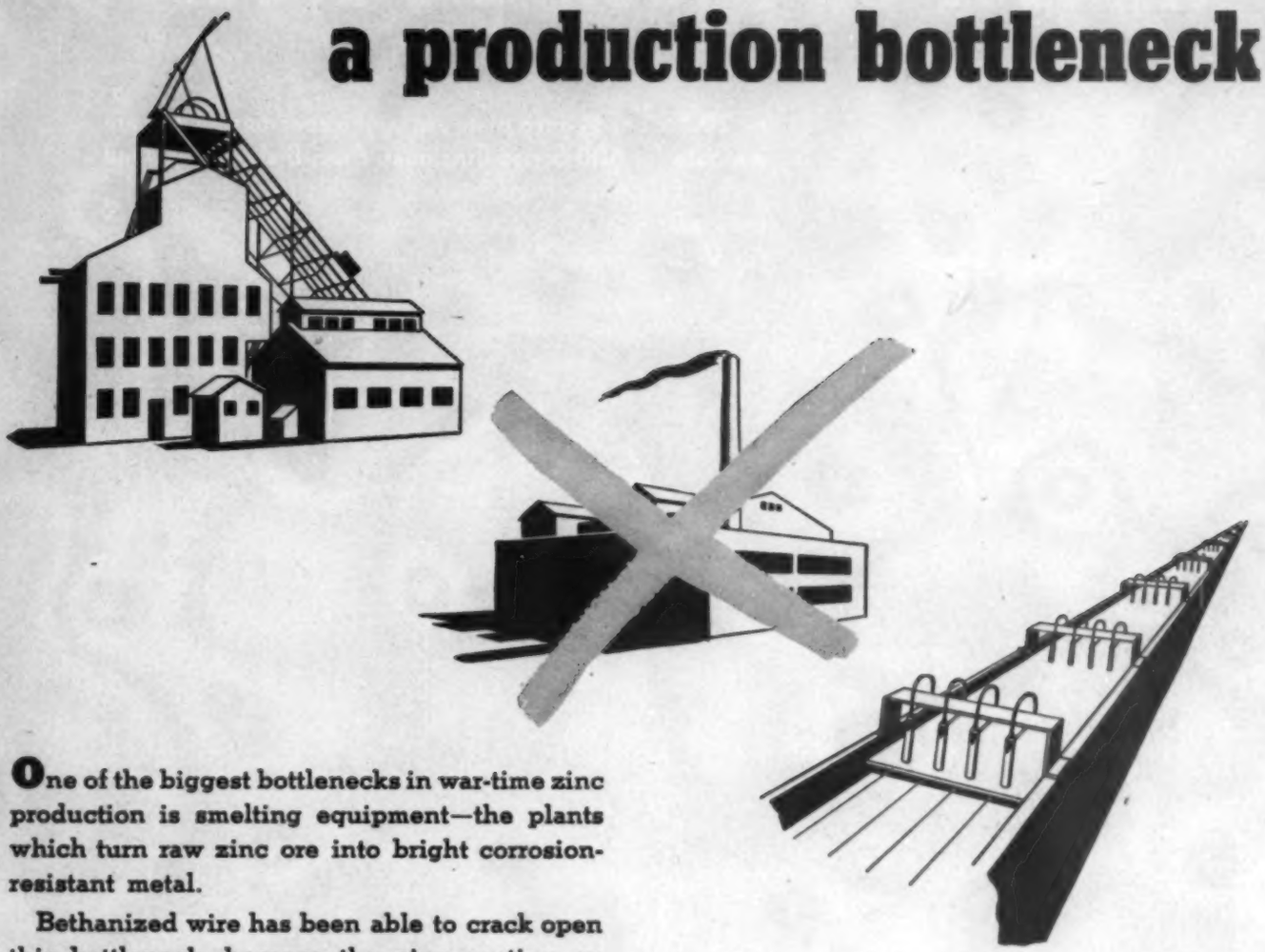
for BLOOMING MILL AUXILIARY DRIVES

An extra ingot an hour has been obtained since installing the above EC&M Screwdown Controller with *LINE-ARC* Contactors.

You will find EC&M Rheostatic Control on many other mills and particularly on mills that are breaking *all* the records.

THE ELECTRIC CONTROLLER & MFG. CO.
Cleveland Ohio

Bethanized Wire cracks a production bottleneck



One of the biggest bottlenecks in war-time zinc production is smelting equipment—the plants which turn raw zinc ore into bright corrosion-resistant metal.

Bethanized wire has been able to crack open this bottleneck, because the zinc coating on bethanized wire is produced directly from the zinc ore. No smelting is necessary.

The electrolytic bethanizing process draws 99.9+ per cent pure zinc out of solution and deposits that zinc on the wire to form a coating that is uniform both *along* and *around* the wire; a coating that is so tight it won't flake or peel off even when the wire is drawn through dies. In addition to these advantages, a bethanized coating offers unusually good resistance to atmospheric corrosion, as this coating can be applied in double or triple weights.

Bethanized wire is doing many kinds of war jobs—from armoring submarine cables to providing a much-needed alternative material for brass in zippers on pilot's suits and parachute packs.

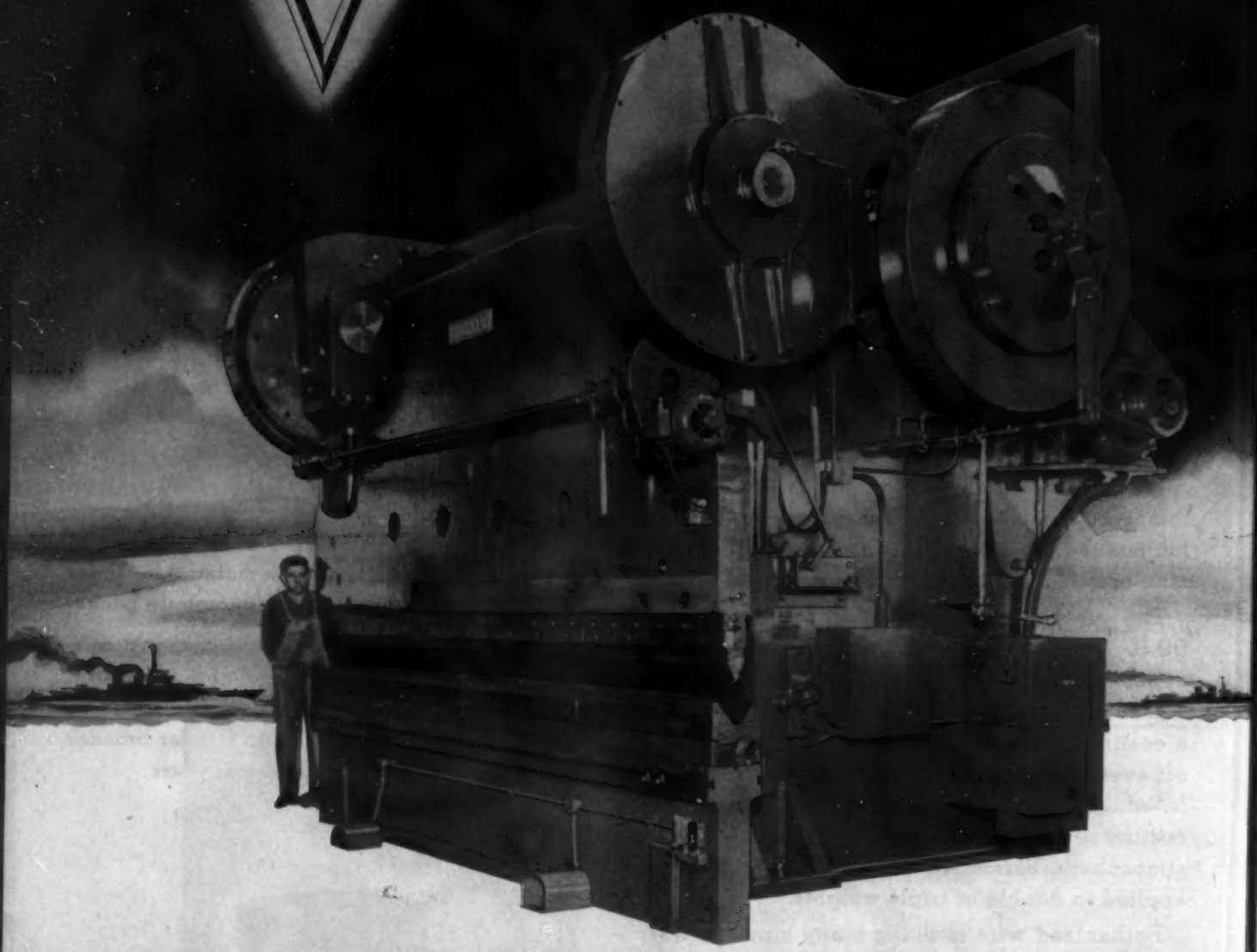
Under the stress of emergency, many new jobs have been discovered for bethanized wire, necessitating revision of all previous ideas as to its possibilities, and pointing to a far broader field of usefulness in the post-war years.

BETHLEHEM STEEL

12 feet of 1 inch plate, *cold*...

or **20** Feet of ¾-inch plate are large capacities . . . But are standard for 500 Series Cincinnati Press Brakes. Day and night, Cincinnati Press Brakes, quickly and accurately, form plates in navy yards, shipyards and other industries for Victory on land and sea. • • • • • • • •

Write for CATALOG B-1, illustrating complete line and many uses of Cincinnati Press Brakes



THE CINCINNATI SHAPER CO.

CINCINNATI OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

1. TIER-LIFT ELECTRIC PLATFORM TRUCK

2. 20-TON CAR HANDLING FOUNDRY MOLDS

3. SPECIAL LARGE CAPACITY CORE-OVEN CAR

4. 2-TON RUBBER-TIRED PLATFORM TRAILER

5. A VETERAN TIER-LIFT ELECTRIC TRUCK

6. RUBBER-TIRED STOCKROOM TRAILER

7. PLATFORM TRAILER WITH STEEL WHEELS

8. LOW-LIFT TRUCK PUSHING PLATFORM CAR

9. TWO 40-TON DOUBLE-TRUCK PLATFORM CARS

10. LOW-LIFT ELECTRIC PLATFORM TRUCK

11. 5-TON PLATFORM CAR, TIMKEN BEARINGS

12. OPEN FRAME TRAILER, 5000 LBS. CAPACITY

ANYTHING ON WHEELS

All of these cars, trucks and trailers are serving *one* manufacturer — an Army-Navy 'E' plant. *All of them were engineered and built by* EASTON. Still, they show but a few of the hundreds of different types of EASTON handling equipment which are moving the materials for War Production. Here is a wealth of 'know-how' that makes EASTON your material handling headquarters. For information on modern, efficient handling methods for all types of raw materials, parts, finished products or waste, write to: Engineering Counsel, Easton Car & Construction Company, Easton, Pennsylvania.

A-1002

EASTON

INDUSTRIAL CARS
TRUCK BODIES · TRAILERS
ELECTRIC LIFT TRUCKS

BEHIND THE SCENES

Oatmeal and Soup Bricks

■ Last week we had a church pew manufacturer apparently converting to shell production; now comes the story via our Chicago office of another bit of "imagineering" (to borrow from the Aluminum Co. of America) by the Milwaukee Foundry Equipment Co.

Among their standard products they have for some time made briquetting machines for borings and turnings but in his office a few days ago Palmer E. Hanson, sales manager, was fondling odd little one-inch briquettes which certainly were neither borings nor turnings. "Oatmeal", he explained, " . . . enough in that little cube for a nice big bowl." In a few weeks they'll deliver another machine to compress dehydrated soups into briquettes.

A long cry from the days we used to sit by the wood cook stove in Granny's kitchen while the big kettle of good old fashioned vegetable soup stewed away all day long. Come peace, we'll undoubtedly use them and like them but thank Heavens she was spared the conversion to dehydrated briquettes.

Markets After the War

■ Speaking of the future, don't miss reading in full the booklet prepared by S. Morris Livingston for the Department of Commerce entitled "Markets After The War". It was reviewed in STEEL two weeks ago and has been getting a tremendous amount of publicity in all the papers, but the only way to really absorb the implications is to read and study it complete.

Notes on Substitution

■ It is chock-full of facts, figures and suggestions for long-range planning and we'll make no attempt to quote more than this one statement which seemed particularly graphic. He says that if all the planned capacity for aluminum production were substituted for steel at the rate of one pound of aluminum for two of steel, it would amount to less than five per cent of present steel production.

Short but Sweet

■ Thirty-five dollars a word recently put Franklin Myers of General Electric's Schenectady works into the top-paid writing class of Calvin Coolidge and Will Rogers. But Mr. Myers was not so prolific as he was pertinent. He wrote a 14-word suggestion for improving radio-transmitter production for which he received $500. The suggestion will save approximately 6000 manhours a year.

Early Renewals

■ Apparently some parts of the government have heard about the paper shortage anyway. From the National Bureau of Standards comes the following:

On account of the paper shortage we thought it advisable to notify you in advance that our subscription will be renewed July 1, 1943. Please send all issues so that our file will not be broken.

While it may not be necessary to let us know before our first notice is sent out, it will be greatly appreciated if you will take care of your renewal instructions as promptly as possible when your subscription does expire. Over 80 per cent of all our subscribers renew year after year, anyway, and it will make our problem that much easier if you will shoot your renewal in right away so that we can figure our press run as accurately as possible.

At It Again

■ Apologies all around for the slip last week in spelling Brinell *Brinnel*. We really know better but it's just the same as our trying to spell *Cuyahoga*. We've lived around Cleveland for enough years to build up our confidence but every time they ask for the county we get goose-pimply all over and go completely blank.

Misplaced Phrase

■ In the same item where we butchered Mr. Brinell, we also had John Knox visiting a shop out west with a crew of women operators. John now tells us flatly that he made his trip alone and behaved himself every foot of the way.

Postwar Planning Reprint Ready

■ Copies of the 48-page reprint booklet on "Postwar Planning" are now ready and will be sent to all subscribers in limited quantities free of charge. It contains the entire series of ten articles prepared by E. C. Kreutzberg, which ran as a special report to industry in STEEL earlier this year. Requests for copies should be addressed to the *Readers Service Department, Penton Building, Cleveland.*

Need Another Priorities Guide?

■ And, if by the time you received last week's issue of STEEL someone had snitched the separate Priorities Guide Section—or if you did see it and would like additional copies—don't hesitate to say so. A supply is available for regular subscribers free of charge in small quantities. For ten or more, please send 10c apiece.

One on Us

■ We told that embarrassing story on Guy Hubbard last week and now out of all fairness we really must pin the rose on ourselves. One day last week we needed the index of foundry equipment sales back over the last dozen years and so (quite naturally we thought) we trotted up on the next floor to see Frank Steinebach, editor of our sister publication *The Foundry*. But you've probably already guessed the answer—facetious reference was made to our ribbing Guy Hubbard while we were politely referred to STEEL's 1943 Yearbook of Industry issue lying on our own desk for a complete chart of the very index we were after. And so it goes.

Vol. 112, No. 20, May 17, 1943, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 63

Something Hitler never thought of..

. . . that America has machines. With them, Americans can produce more and so earn more. With efficiency, ambition *and machines,* there's no limit to an American's opportunity.

That *opportunity*—open to no other people on earth—is what Americans are willing to fight for.

Hitler never thought of that. He boasted that Americans would sabotage their tools to join his European way, where government does your thinking for you, where you give up all liberty for a cheap and shoddy promise of so-called security. Hitler didn't know that Americans have ambitions for their sons.

The machines that *make* opportunity in America are here *because* that opportunity has existed. 40, 50, 60 years ago mechanics in scores of shops and attics dreamed better tools, worked untold hours to develop them, plowed profits back to build up the companies that make them. Without those machines we would have had no chance in this war; with them we will win it yet, because it is what machines can do for workmen that makes this country worth defending.

WARNER & SWASEY
Turret Lathes
Cleveland

YOU CAN TURN IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

Honing

helped change the "Horseless Carriage" Into AUTOMOTIVE TRANSPORTATION

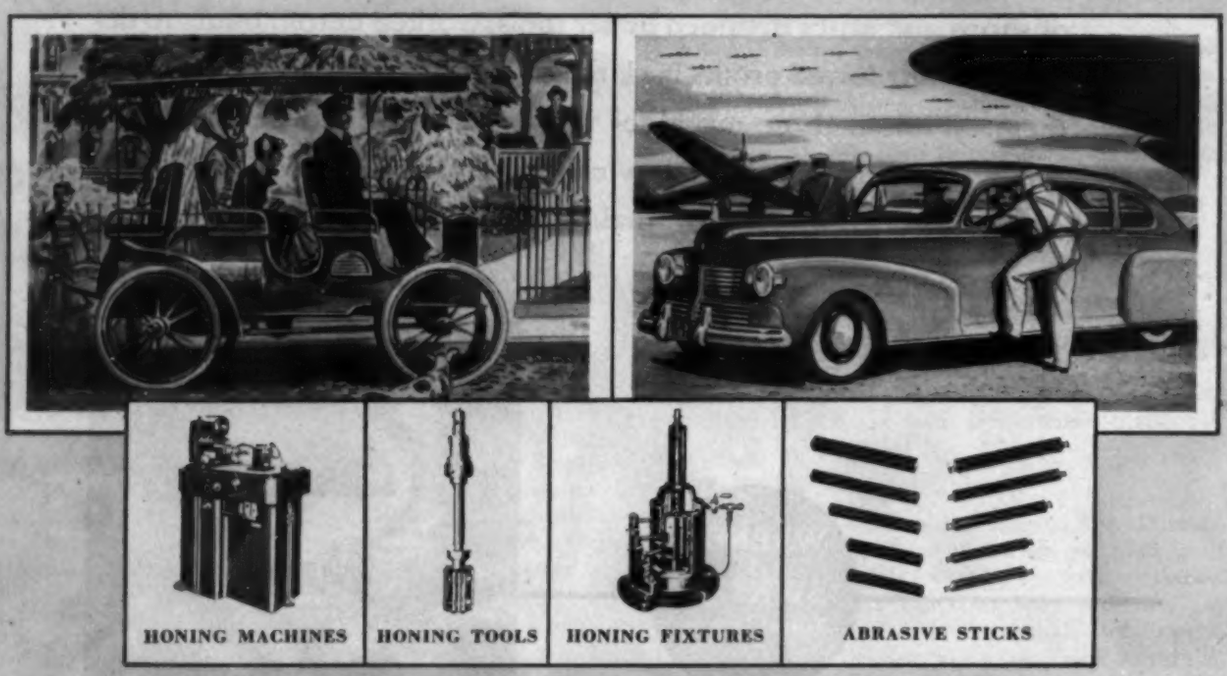
Yesterday—The horseless carriage and its immediate successors proved that a "newfangled contraption" could become an everyday useful device. Its early success could not have been possible without grinding—the first controlled abrading process.

Today—The beautiful sturdy automobile is a marvel of mechanical development and efficiency. It can be well made in millions where its predecessor was poorly made in hundreds. HONING, which provides further control of abrading action, made it possible to make this refined mechanical job in huge quantity.

Tomorrow—Nobody knows what mechanical devices may suit the public need, or catch the public fancy, tomorrow. Postwar planning is not yet definite. But as today's equipment came from yesterday's developments, so tomorrow's will derive from today's. Most of the things we will use tomorrow are already developed.

One thing is certain—mechanical devices used tomorrow will demand better control of machining methods.

And Micromatic has been developing hone abrading controls to be ready for that demand.



HONING MACHINES | HONING TOOLS | HONING FIXTURES | ABRASIVE STICKS

Micromatic HONE CORPORATION
Detroit, Michigan

MAKERS OF HONING MACHINE TOOLS

The NEW Army Mule Also . . .
Must Be Sure of Its Bearings

The dependable instinct of the four-legged army mule has been proverbial in all wars. He is always sure of his "bearings" wherever he goes.

The new army mule—the jeep—also must be sure of its "bearings." Tough as it appears to the eye, the jeep, like all military vehicles, couldn't take the rough going if it did not have maximum accuracy in its precision bearings.

Its bearings and other critical surfaces are finished by Microhoning—the modern abrading process which removes stock at rates up to 65 cubic inches per hour, generates accuracy for roundness and straightness of bore within .0002″ to .0003″, and, any desired surface finish.

Besides making the new mule sure of its "bearings," Microhoning has many other applications in war and peace.

Write for Bulletin A. B. 67

Some Microhoned Automotive Bores

Cylinders
Con Rods Large End
Hydraulic Brake Cylinders
Crankshaft Main Bearing
Crankshaft Pin Bearing Bores
Cam Shaft Bearing Bores
Valve Guides
Hydraulic Shock Absorbers

MICRO MATIC

MICROMATIC HONE CORPORATION
DETROIT, MICHIGAN

Know-how speeds production for buyers of B&W Tubing!

Within the last two years, Babcock & Wilcox Tube Co. engineers have solved problems of procurement, production and design for manufacturers of aircraft engines, airframes, submarines, tanks, and artillery, to mention a few.

Re-check your production techniques now—for possible changes to tubing or of tubing. Then let B&W go to work —not just on your tube specifications—but on your design and production problems.

For Example:

Changes from solid bar to tubing have eliminated boring operations, slashing production time 88% in one case.

Changes from cold-drawn tubing to hot-finished tubing, in conjunction with machining techniques recommended by B&W, have reduced overall costs and accelerated tube deliveries — enabling immediate, instead of questionable delivery in one case.

Changes in specifications of tubing have licked seemingly insurmountable design problems, advancing production by three months in one case.

TA-1238

BABCOCK & WILCOX TUBES

HOT FINISHED • COLD DRAWN • CARBON STEELS • ALLOY STEELS

THE BABCOCK & WILCOX TUBE CO., BEAVER FALLS, PA.

SHOOTING enemy aircraft out of the sky . . . with all guns blazing! . . . this fighter plane uses up shells at an astounding rate.

In achieving an all-time high output of shells, not only for planes, but for guns on the ground and aboard ship, war plants everywhere are making use of *Texaco Cutting Oils.*

Texaco Cutting Oils, including *Clear-tex, Sultex* and *Transultex,* lubricate the tools, prevent chip welding by carrying away the heat, assure improved surface finish, and maximum output per tool grind.

So effective have Texaco Lubricants proved that they are definitely preferred in many important fields, a few of which are listed in the panel.

A Texaco Engineer specializing in cutting coolants will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

The Texas Company, 135 E. 42nd Street, New York, N. Y.

THEY PREFER TEXACO

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

TEXACO

TEXACO Cutting and Soluble Oils

FOR FASTER MACHINING

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

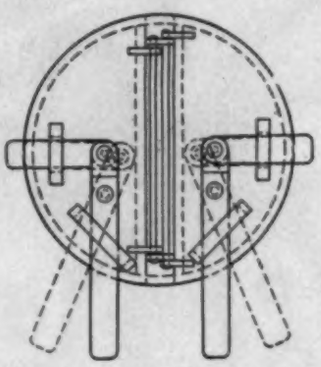
ANOTHER NOVEL PICKLING BASKET DESIGNED IN MONEL

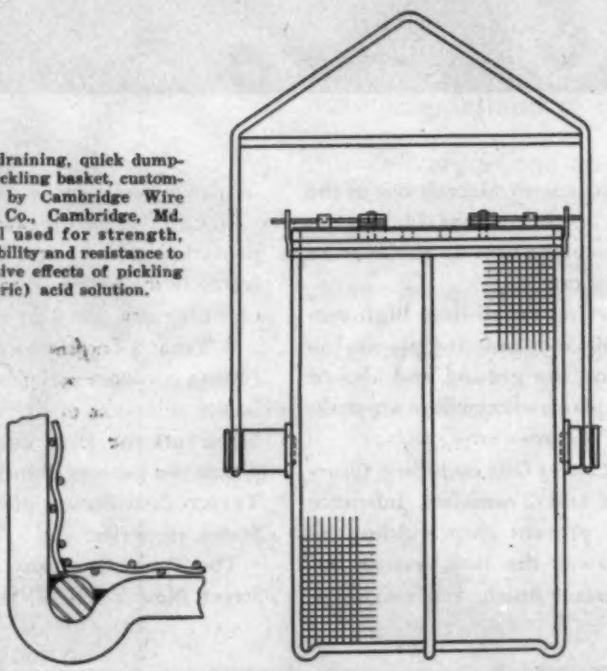
Cambridge Wire Cloth Co. Solves a War Plant's Pickling Problem

Made of Monel sheet and wire screening, this unique pickling basket can be revolved over the solution for complete drainage of the acid. The top is perforated metal with an ingenious fastening arrangement which permits immediate and complete dumping. Although it weighs only about 220 lbs. this basket handles more than 500 lbs. of 22mm. cartridge case cups per load.

Monel is the logical material for pickling equipment since standard mill forms can nearly always be used in constructing specialized equipment. Monel is easy to fabricate and when welded retains its full strength and corrosion-resistant properties. Its long trouble-free life assures more continuous operation with fewer shutdowns for repairs. For additional information on the use of Monel in the pickling room, write:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York, N. Y.



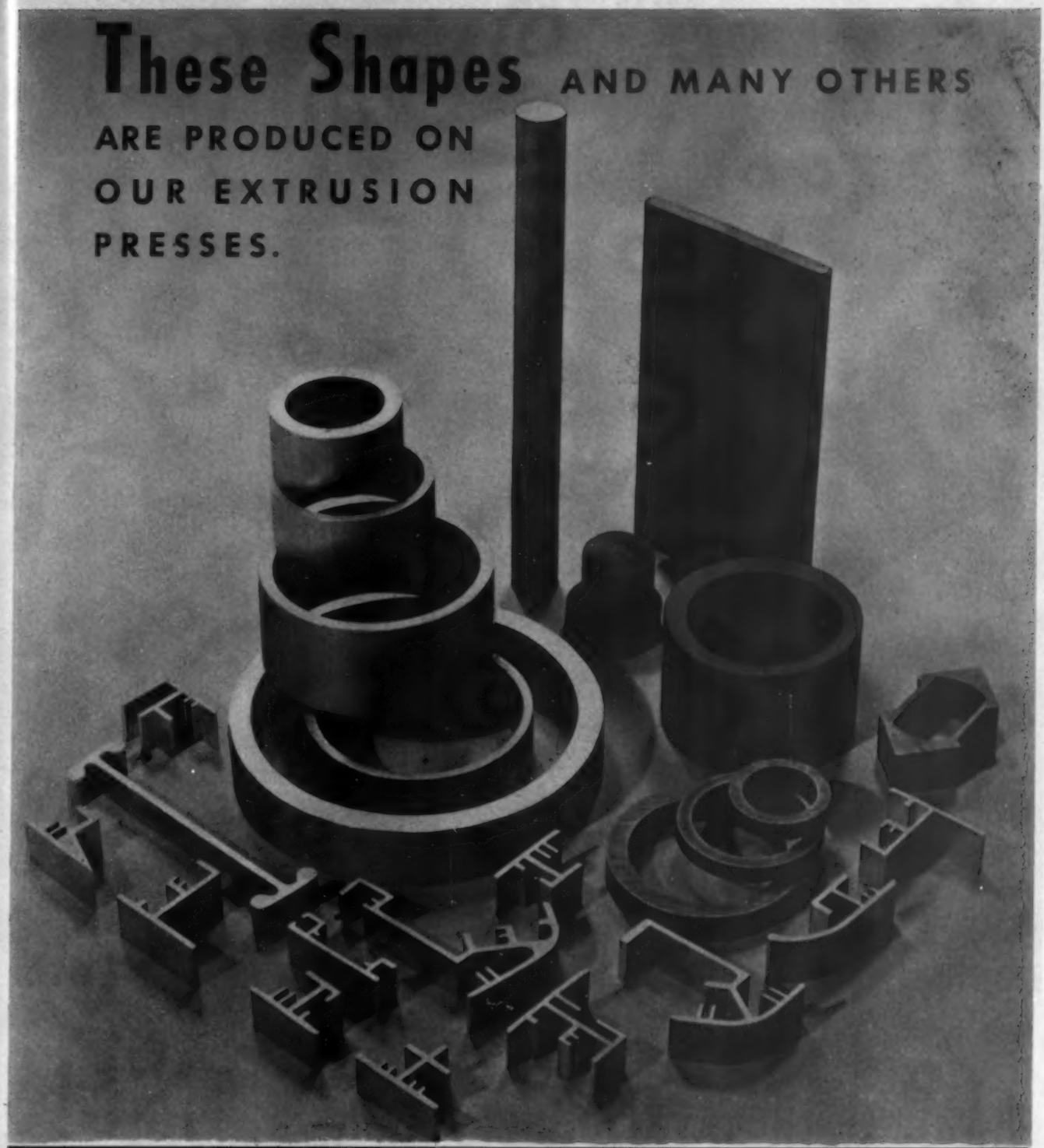


Fast draining, quick dumping pickling basket, custom-made by Cambridge Wire Cloth Co., Cambridge, Md. Monel used for strength, weldability and resistance to corrosive effects of pickling (sulfuric) acid solution.

★ ★ **INCO NICKEL ALLOYS** ★ ★

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • NICKEL • "Z" NICKEL

Sheet...Strip...Rod...Tubing...Wire...Castings



HYDROPRESS · INC.

ENGINEERS CONTRACTORS

HYDRAULIC PRESSES · ROLLING MILLS
PUMPS · ACCUMULATORS

570 LEXINGTON AVENUE · NEW YORK · N. Y.

Against the Avaricious Enemy... TIME!

The life of equipment in battle is short. No more is expected... it's the fortunes of war. In another battle, here at home, we're fighting with machines that *CAN'T* be readily replaced... their working life must run into untold hours to keep up the steady flow of armament our fighting men need. So, their enemy is TIME. TIME, that bombards them with tortuous hours of wear. Here, as on the battlefronts, Ball Bearings play a mighty part in keeping the "wheels" turning. Without Ball Bearings, TIME would bring our vast war industry to its knees. The Fafnir Bearing Company, New Britain, Connecticut.

ARMY E NAVY

FAFNIR

BALL BEARINGS

THE BALANCED LINE - FOR ORDNANCE, AIRCRAFT AND INDUSTRIAL MACHINERY

HIS ANSWER:

A W. F. AND JOHN BARNES 16-FOOT STROKE DRILLING AND BORING MACHINE

This 83,000 lb. machine was completely assembled and tested on our new assembly floor before shipping. It was designed for drilling or boring large cylindrical work and machines two parts simultaneously. It occupies 371 square feet of floor space, and is built in two sections.

This is an excellent example of the wide range of engineering and manufacturing facilities available from the W. F. and John Barnes Company.

This manufacturer had a boring problem. Analysis of the part and necessary operations revealed that the final machine would require a floor area of 371 square feet. Thus, another factor entered into the selection of a machine designer and manufacturer to handle the job . . . manufacturing and assembly capacity.

To machine the long, heavy beds and other component parts of equipment of this size calls for machines of equally large capacity. In addition, assembly space must be ample for erecting and testing the equipment before shipment. You'll find both at W. F. and John Barnes.

Whether your problem involves low or high production, in drilling, boring, milling, tapping and honing operations, our engineers will be pleased to work with you. There is no obligation.

HOW TO GET A MACHINE TO FIT *YOUR* JOB!

Write for this set of eight bulletins describing the Barnes method of obtaining better machines. Each bulletin traces a machining problem from the original study of the part to the final machine design. Ask for bulletins S-31 through S-38.

PROBLEM SOLUTIONS IN ANY MACHINE SIZE

This small machine, designed and built to face two bosses in a small cast-iron housing, is another example of a machine designed for a specific job.

W. F. & JOHN BARNES

W. F. and JOHN BARNES

340 SOUTH WATER STREET • ROCKFORD, ILLINOIS, U.S.A.

Sensitive Control

for straightening 37mm and 57mm gun barrels

Farquhar Hydraulic Presses have built-in sensitive control for exerting accurate pressure on straightening gun barrels as shown here. These Farquhar Hydraulic Presses are at work in the ordnance plant of the Struthers Wells Corporation.

The gun barrels, which have already been drilled, are accurately checked at seven different points and straightened before final turning and boring. The large photo shows a 50 ton Farquhar press at work on 37mm barrels and the smaller photo shows a 250 ton Farquhar press at work on 57mm barrels. V blocks and roller carriages at both ends of the bed may be adjusted to support the barrel at any point. In addition the pressing unit of the 250 ton press may be moved along the barrel by means of a motorized drive to apply pressure where necessary.

Farquhar Hydraulic Presses are made in all sizes from 3 to 7200 tons for a variety of operations.

HYDRAULIC PRESS DIVISION
A. B. FARQUHAR CO., Limited, YORK, PENNA.

ARMY E NAVY

Farquhar

HYDRAULIC PRESSES

IF IT'S PIPING CONTACT FLORI

The construction of a power dam requires huge quantities of fabricated pipe and plate steel products . . . All this is within our scope

Fabricated Piping—for steam, water, air, oil, gas, chemicals • Random mill or cut lengths, bent, coiled, threaded, welded, flanged • Valves, Pipe Fittings

In brief: anything in tubular or plate steel fabrication. Send your inquiries.

FLORI PIPING

THE FLORI PIPE COMPANY • ST. LOUIS—CHICAGO

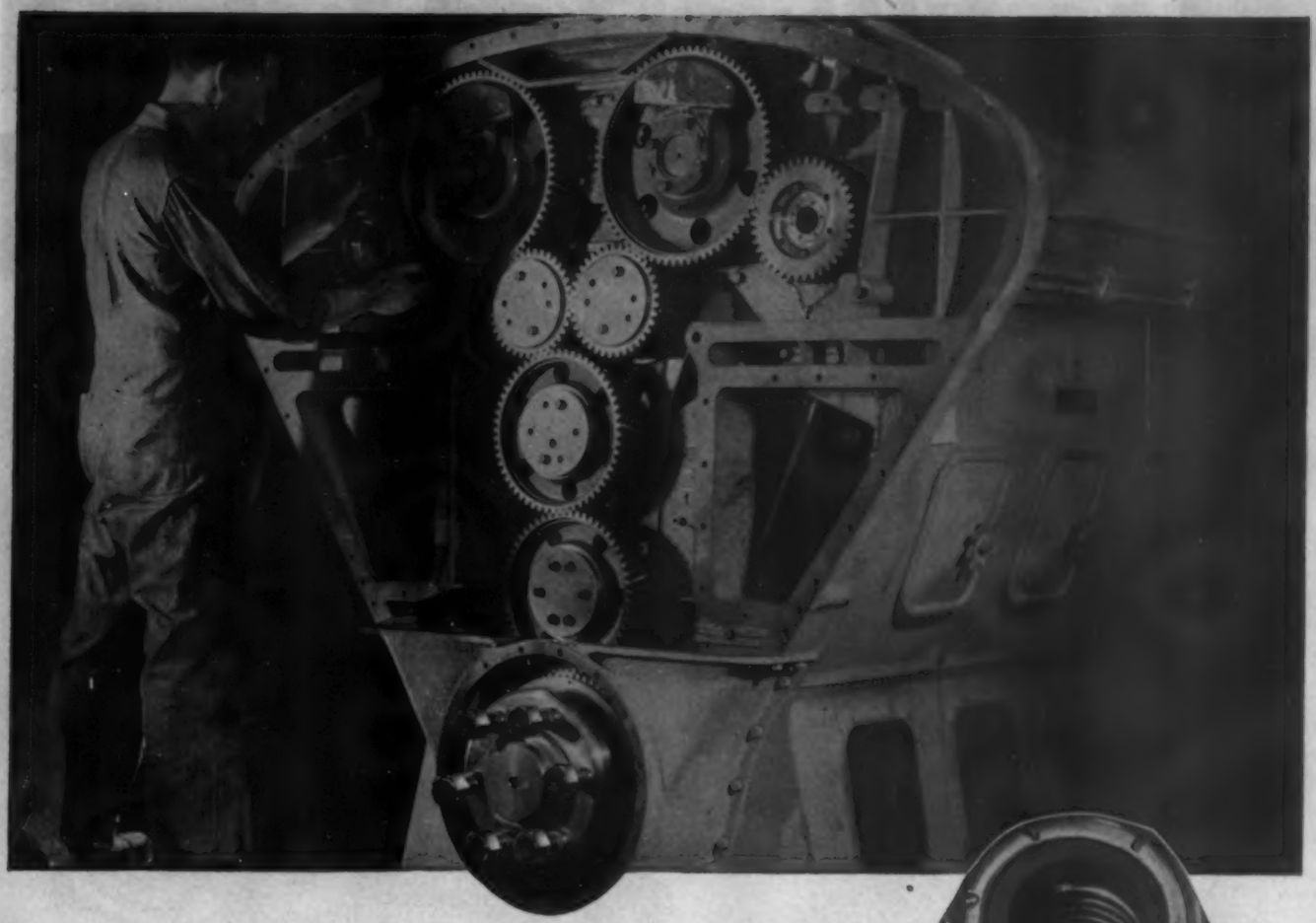
The SELLERS Model 6-G Drill Grinder is Ideally Suited to Present Day Operating Conditions

AUTOMATIC!—that is one feature that makes the Sellers Drill Grinder invaluable today. With inexperienced, newly-trained operators, drill grinding can no longer depend on the skill of the old-time machinist who prided himself on his ability to grind tools. The machinist is busy on more important work. So the shop with the Sellers 6-G Drill Grinder can turn that job over to the Tool Crib boy—or girl—and be sure the drills will be ground automatically with accurate drill points and duplicate lips and correct clearances. Drills from ¼" to 3" can be ground quickly and accurately, burned and broken drills can be reclaimed, drilling operations move smoothly because drills are always in condition.

WM. SELLERS & CO., INC., PHILA., PA.

SELLERS 1848

Sellers



SIX NUTS THAT BRIDLE A THOUSAND HORSEPOWER

THIS is the business end of a powerful Diesel engine.

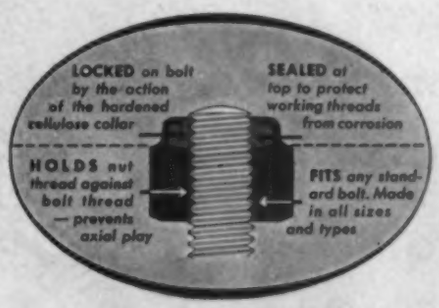
Well over a thousand horsepower spins through that coupling – through those six studs.

To connect that coupling, old-style lock fastenings wouldn't do. They couldn't both lock and be tightened to spread the load evenly. So studs failed.

The solution shows in the photo – Elastic Stop Nuts.

With these fastenings, uniform pressure was obtained as well as complete security against nuts working loose.

In the peacetime production to come, equally puzzling problems will plague manufacturers.


LOCKED on bolt by the action of the hardened cellulose collar
SEALED at top to protect working threads from corrosion
HOLDS nut thread against bolt thread — prevents axial play
FITS any standard bolt. Made in all sizes and types

And we are prepared to help. Our engineers who today are solving war production problems will be ready to share their wide experience with you.

Whenever you have a fastening job let us know. Our men will work with you on it and recommend the correct Elastic Stop Nut to produce a better product or to facilitate its manufacture.

ELASTIC STOP NUTS

Lock fast to make things last

ELASTIC STOP NUT CORPORATION OF AMERICA, UNION, NEW JERSEY

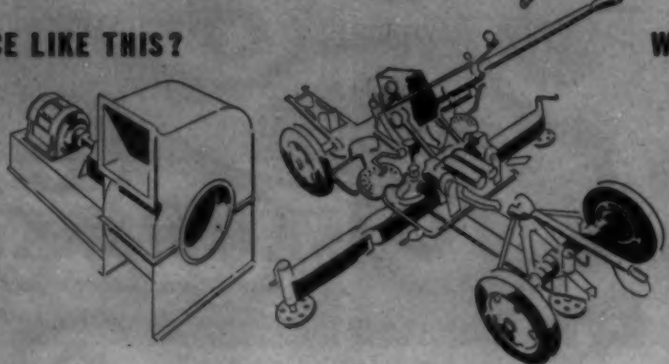
ESNA TRADE MARK

How Steel helps a

What will your "Designs for Tomorrow" need to make them successful?

CORROSION RESISTANCE LIKE THIS?

. . . Much of the air that passes through marine blowers contains corrosive chemicals and moisture. But in these hectic times, engineers on shipboard can't bother with excessive maintenance on this kind of equipment. So many designers specify U·S·S Copper Steel for blades and housings. It gives twice the atmospheric corrosion resistance of plain steel at little additional cost.



WELDABILITY LIKE THIS?

. . . The excellent welding properties of high-strength, low-alloy steels helped American ordnance engineers redesign the carriage chassis of the famous Swedish Bofors anti-aircraft gun for faster production, better performance and economy of fabrication. Welded construction made possible a substantial weight saving, too. If your new products involve difficult fabrication, check steel's weldability!

Flying Fortress "sit down"

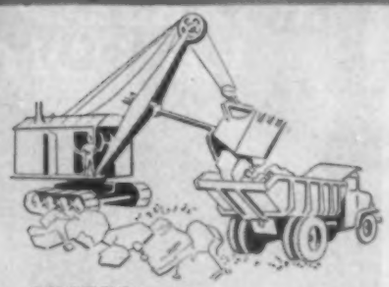
Alloy steel construction gives this bomber's landing gear the strength to "soak up" 80-ton shocks

A bumpy landing with a 25-ton bomber is no "love-tap!" The impact can be as great as 80 tons. That's why Boeing engineers designed into the Fortress' landing gear the greatest possible strength consistent with required lightness. And that's why almost every part of its landing gear—actuating arms, links, struts and hydraulic cylinders—are made of alloy steel.

The same U·S·S Alloy Steels that now are helping our fighting planes to land safely are your key to designing greater stamina and a better strength-weight ratio into a wide variety of metal products, both for military application and to meet the peacetime needs of a more modern America.

Get set to take full advantage of Steel's versatility in your future designs

Stepped-up war-time research has made steel an even more useful design tool than ever before. So you'll want to familiarize yourself with new steels and new uses of steel. Keep up-to-date on steel's performance in its hundreds of difficult war assignments. Make note of facts that will help solve your own design problems. Keep in touch with our engineers for information on any kind of steel. These experienced metallurgists will gladly help you apply U·S·S Steels where they will do the most good for your products, present or future.



SHAFTS for heavy equipment — shovels, trucks, tractors, bull-dozers, cranes, earth-moving equipment—need the rugged strength of alloy steel. Thousands of tons of U·S·S Carilloy Alloy Steels are already in service, keeping this essential equipment at work on war jobs. Whatever manufacturing or service requirements your new products may have, our engineers can recommend exactly the right U·S·S Alloy Steels to meet your needs economically.

GEARS of every type, from the giant gears of battleships down to the tiny worm gears of precision instruments, can be machined from U·S·S Alloy Steels with uniform accuracy. Close control of these steels at our mills makes them easy to forge, easy to machine. And they respond uniformly to annealing and heat treatments.

THESE U·S·S STEELS offer one of your most complete sources of design inspiration:

U·S·S HIGH TENSILE STEELS *to resist corrosion and increase strength without adding weight.*

U·S·S COPPER STEEL *to give twice the atmospheric corrosion resistance of regular steel at little cost.*

U·S·S ABRASION-RESISTING STEEL *to combat wear and friction.*

U·S·S STAINLESS AND HEAT-RESISTING STEELS *to assure high resistance to corrosion and heat, and to reduce weight.*

U·S·S CARILLOY ALLOY STEELS—*Special steels for the special jobs of industry.*

U·S·S PAINTBOND — *A galvanized, Bonderized sheet that permits immediate painting and holds paint tighter.*

U·S·S VITRENAMEL—*Designed especially for porcelain enameling. Etched to give excellent adhesion and finer finish.*

U·S·S HOT-ROLLED AND COLD-ROLLED STEELS *to give the basic advantages of steel, plus maximum economy in accordance with the requirements of each individual job.*

U·S·S ELECTRICAL STEEL *for motors, generators and transformers.*

USS

ONLY STEEL CAN DO SO MANY JOBS SO WELL

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

United States Steel Supply Company, Chicago, *Warehouse Distributors*

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UNITED STATES STEEL

AIRCO No. 230 A. C. Electrode for TOP-FLIGHT WELDING in all positions

Faster welding and better quality welds in the overhead, vertical, and flat positions—that's what the Airco No. 230 AC electrode makes possible. Used with alternating current, the Airco No. 230 provides a stronger, forceful arc that eliminates most of the difficulties usually met in vertical and overhead welding.

Airco No. 230's special extruded coating, together with its spraying action and greater arc force, permits rapid solidification of the weld deposit and faster deposition speeds. At the same time, the quality and contour of weld deposits is always excellent. Recommended for the welding of mild steel, Airco No. 230 is also ideal for welding low-alloy, high tensile steels where sections thinner than 1/4" are used, and where such materials are chosen principally for their high tensile strength.

Airco No. 230 AC electrode is made in 1/8" and 5/32" dia., 14" length. It meets the requirements of Classification E 6011 of AWS and ASTM Specification A233-42T; and A.S.M.E. Boiler Code, Paragraph U-68. In addition, Airco No. 230 AC electrode bears the approval of the American Bureau of Shipping, under Group Classification H1G and B1G. For further details on the Airco No. 230, write your nearest Air Reduction office.

STRETCH YOUR D. C. ELECTRODE SUPPLY WITH AIRCO NO. 63

Use Airco No. 63 Washed Coat electrode for tacking, light fabrication, and similar welding work not subject to code regulations. Airco No. 63, available on low priorities, has a light surface coating which improves arc stability and operating characteristics over those of bare electrodes. Made in five diameters—3/32", 1/8", 5/32", 3/16", and 1/4". Write your nearest Airco office for details.

Air Reduction

General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.

IN TEXAS: MAGNOLIA-AIRCO GAS PRODUCTS CO.
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IDLE CYLINDERS ARE PRODUCTION SLACKERS: *Keep 'em rolling for victory!*

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Meehanite's CONSTANT RESEARCH, INVESTIGATION and recorded experience help solve your castings problems

WHEN you come to a Meehanite foundry with a problem involving castings, the recommendations made by the foundry are backed by a vast amount of metallurgical and application data. This represents not merely the experience of one foundry, but includes information obtained through years of scientific research by Meehanite engineers, plus practical solutions of individual problems worked out by Meehanite foundries all over the world.

Furthermore, you can have full confidence that the recommendations will be carried out. Due to the precise control of the type and quantity of raw materials, and the strict regulation of cupola, molding and casting practice, the Meehanite foundry is able to control closely the metallurgical structure of the metal and its physical properties, thus fulfilling your particular service requirements.

The properties most generally desired, either singly or in combinations are: high strength combined with resistance to fatigue, wear resistance, free machinability, corrosion resistance, vibration absorption, toughness, etc. Let your Meehanite foundry tell you more about this unique series of metals.

MEEHANITE RESEARCH INSTITUTE, New Rochelle, N. Y.

47 pages of engineering data sent free to executives, engineers, designers, promotion men. Ask for bulletin No. 14.

WHO GO DOWN TO THE SEA IN SHIPS

No saga of the sea is complete that overlooks the courage and devotion of those who serve on America's great fresh water seas.

Full credit must be given to the American manhood that makes possible the magnificent performance of the Cleveland-Cliffs fleet.

Cleveland-Cliffs Ore in Cleveland-Cliffs boats is at the command of industry.

LAKE SUPERIOR IRON ORES
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THE CLEVELAND-CLIFFS IRON CO.

CLEVELAND · · OHIO

DOES ONE "Absentee Part" RETARD YOUR PRODUCTION?

"X" MARKS THE SPOT
THAT BLOCKS PRODUCTION!

ARE schedules missed because one difficult *part* is hard to get? Do inspection rejections unbalance your production line because one *part* fails to meet quality standards? Does your war production suffer . . . is progress retarded on your new post-war product plans . . . because of "absentee parts"?

Contact KAYDON

High precision production of difficult parts . . . coordinating part design and production methods to speed output, improve utility, or lower costs . . . assuring "on time" deliveries to avoid "absenteeism" of parts . . . these are services the Kaydon organization offers, based on a sound background of engineering and precision manufacturing experience.

For excellence in production of extremely precise, unusually large ball and roller bearings.

THE KAYDON ENGINEERING CORP.

McCRACKEN STREET • MUSKEGON, MICH.

Specialists in Difficult Manufacturing

JESSOP . . .

Top Notch Tool Steel

Use Jessop Top Notch-"H" Steel for the many applications requiring resistance to severe and repeated impact. It is a chrome-tungsten alloy tool steel, combining hardness with extreme toughness, and possesses a good surface for wear resistance. Top Notch has a tough core and high tensile strength. We recommend Top Notch-"M" for pneumatic and electric tools of all descriptions. Top Notch-"H" is suited for hot work applications up to approximately 1000°F. Write for complete information.

ESTABLISHED 1901

JESSOP STEEL COMPANY

HEAD OFFICE AND WORKS ***WASHINGTON...PENNA.***

WAREHOUSES:
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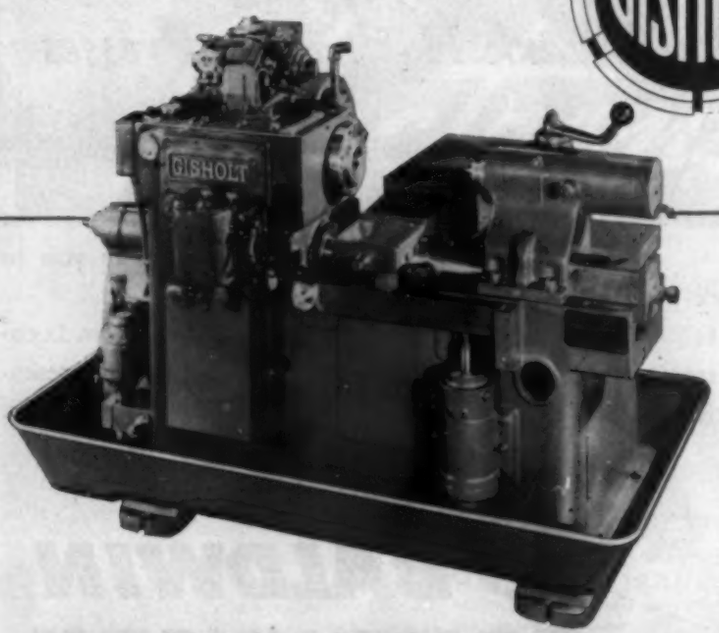
They said, "NO EXPERIENCE NEEDED!"

It's hard to imagine a machine easier to run than the Gisholt Hydraulic Automatic Lathe. Here, one small lever controls a whole cycle of machining operations. With but little more to do than load the chuck and remove finished work, one operator often tends several machines. Yet, here is sustained high-speed production and accuracy no skilled machinist could equal on a non-automatic lathe.

GISHOLT MACHINE COMPANY
1217 East Washington Avenue • Madison, Wisconsin

Look Ahead . . . Keep Ahead . . .
With Gisholt Improvements in Metal Turning

GISHOLT



THE GISHOLT HYDRAULIC AUTOMATIC LATHE handles a wide variety of chucking and between-centers work. Its extremely rigid construction permits multiple cutting with accuracy at high cutting speeds. Ask for literature.

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FOR DIE-HOBBING

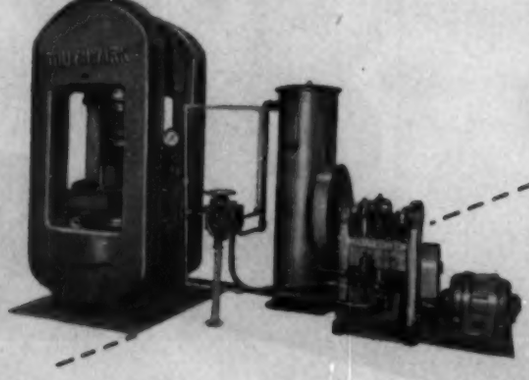
Southwark Hydraulic Presses

Close control, smoothness in power application and rugged dependability are built-in features of Southwark hydraulic presses. These qualities are indispensable for accurate die-hobbing.

Sound design, good materials and honest workmanship are part of every Southwark press. Southwark's years of press building experience are paying real dividends to the leaders in the plastics industry now that uninterrupted production is all-important.

When you're planning new plant equipment for the competition of tomorrow it will pay you to specify Southwark.

Baldwin Southwark Division, The Baldwin Locomotive Works, Philadelphia; Pacific Coast Representative, The Pelton Water Wheel Co., San Francisco.



THE BALDWIN GROUP

BALDWIN SOUTHWARK

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ELECTRONIC Instruments in the industrial plants of tomorrow will supply that life-blood of change and improvement which makes for scientific progress and commercial success.

To anticipate the exacting demand of industry's future instrumentation, Brown and Minneapolis-Honeywell engineers have assumed the obligation of leadership in pioneering new developments for the measurement and control of industrial processes.

THE BROWN INSTRUMENT COMPANY, 4462 WAYNE AVENUE, PHILADELPHIA, PENNSYLVANIA
DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR CO.
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Instruments by **BROWN** *and Controls by*

MINNEAPOLIS-HONEYWELL

Install "Airgrip" Devices, and

She'll beat Bill's output by 25%, or more

This is the old "strong-man," time-wasting, operator-tiring, high-unit-cost way of holding parts. Hour after hour the operator wrestles with a wrench—sapping his energy, increasing scrap, holding back production, and wasting critical machine hours.

Yes, she can take Bill's place and beat his best production record by 25%, or more, when you install "Airgrip" Holding Devices. They are available now, and installation is simple and fast.

She will quickly learn to use "Airgrip" Devices, producing at the full capacity of the machine—a thing Bill never could do with all his bulging muscles. And, because "Airgrip" Devices are so easy to operate, she will work a full turn and have output on schedule when the whistle blows.

It will pay you to investigate the advantages of "Airgrip" Holding Devices—increased production of 25% or more, lower cost per piece part, reduced spoilage, minimum operator fatigue.

"Airgrip" engineers are ready to help you on any problem where air can be used for fixtures or chucking purposes.

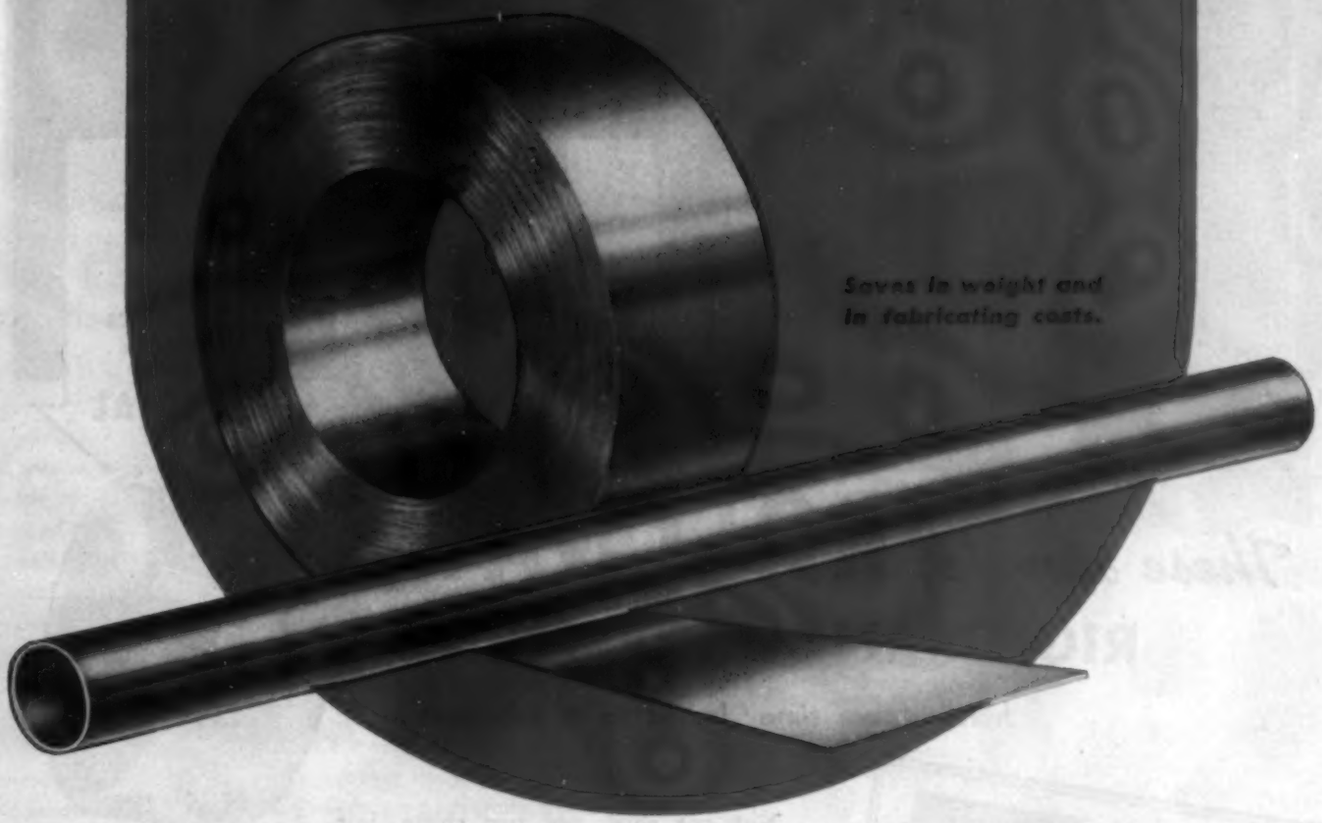
Anker-Holth Mfg. Co.

"Airgrip" Chuck Division

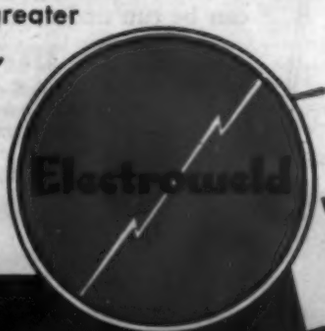
332 So. Michigan Ave. Chicago, Illinois

Electroweld Tubing

Includes Strip Steel Accuracy and Precision Welding



ELECTROWELD TUBING is manufactured on the latest type and most modern tube mills, thus assuring uniform high qualities at all times. This outstanding product meets accurately your rigid requirements, but more than that, the specified qualities are duplicated in order after order, and shipment after shipment. The Electroweld manufacturing process permits the selection of accurately rolled strip steel which definitely meets your needs. And, with this uniform, high quality basic material you obtain maximum strength, greater safety, more uniform wall thickness, uniform diameters, and silver-bright, smooth finish. Remember, too, the exhaustive tests made during 1929 by the Bureau of Standards proved conclusively that the weld in tubing is as strong as the wall, and has the same quality as the steel with regard to strength and other physical properties. The tests included expanding, beading, flanging, and drawing. Electroweld Tubing is made in strict accordance with Government, A.S.M.E. and also A.S.T.M. specifications. Hence, where performance factors are VITAL be sure to investigate the benefits of Electroweld Tubing.



SIX ADVANTAGES

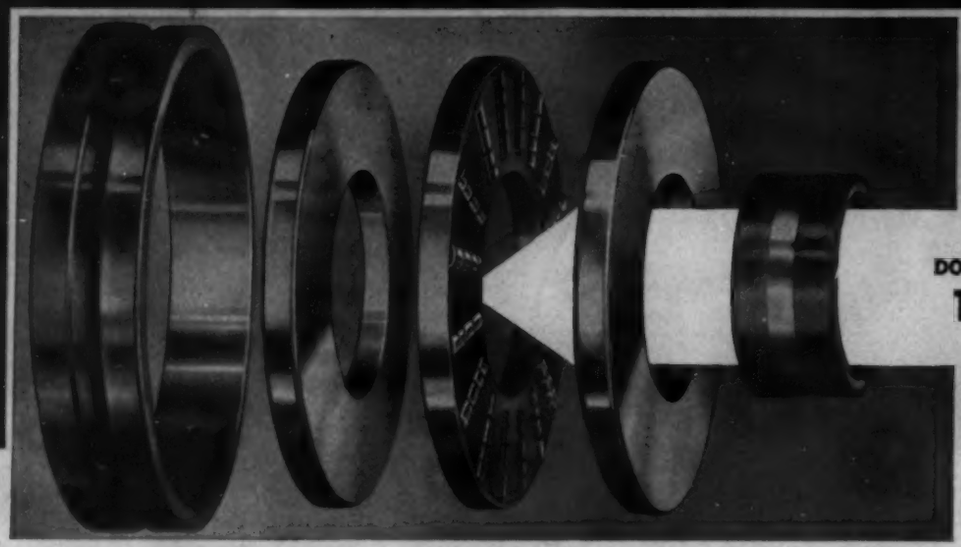
Uniform diameter • Uniform wall thickness • Uniform physical properties • Test-proven welds • Scale-free, silver-bright finish • Square cuts, minimum burr

Electroweld STEEL • • OIL CITY, PENNA.

A Division of TALON, INC.

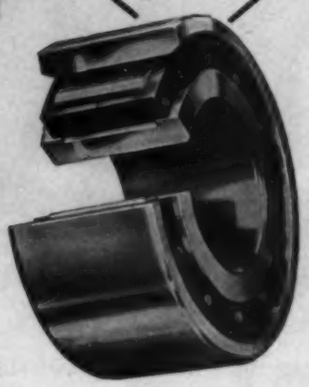
Manufacturers of pressure and mechanical steel tubing

When Every Machine Must Do 3 Machines' Work!



*Type SDT
DOUBLE ACTING
THRUST

*Type MCS
DOUBLE
WIDTH
RADIAL



These simpler ROLLWAY
RIGHT-ANGLED BEARINGS

hold "down time" losses to a minimum . . .

For longer bearing life, more efficient performance and more economical maintenance . . .

FOLLOW THIS BASIC BEARING PRINCIPLE

- All radial loads carried at right angles to the roller axis.
- All thrust loads carried at right angles to the roller axis.

Not one shift, not two shifts, but THREE SHIFTS A DAY! That's the three-machine load your equipment must handle today. No wonder bearing wear increases. No wonder old-time service factors fail to predict bearing life. But even with this tripled operating time, there's a way to carry bearing loads that will make your bearings stand up longer. Here's the fundamental principle to follow:

Right-Angled Bearings Simplify the Load

Because they carry every load at right angles to the roller axis, Rollway Right-Angle Bearings split the load into its two simple components of *pure radial* and *pure thrust*. Only one of these loads is carried by a single bearing assembly. There are no oblique resultants, no compound pressures on the rollers. Magnitude of the stresses is considerably reduced. Life of the bearing is substantially increased. And machines can be run under heavier loads for longer periods.

Standard Sizes For Most Applications

S.A.E. or American Standard metric dimensions and tolerances are available for most applications . . . in a wide range of sizes and types that are "engineered to the job." Let Rollway's specialized bearing experience help you. Send your design or change-over specifications for free, confidential bearing analysis and recommendation. No obligation.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**

Why Chromium is used in ENGINEERING STEELS

Small amounts of chromium (0.2–2.0%) are used in many engineering steels because chromium increases—

- Hardenability
- Toughness
- Impact Resistance
- Wear Resistance
- Ductility at high tensile strength

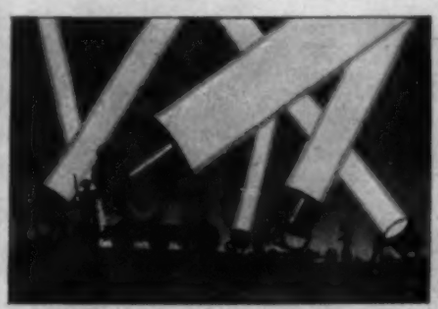
Alone, or in combination with nickel, silicon, vanadium, manganese, molybdenum, zirconium, boron, or other alloying agents, the use of chromium in engineering steels produces markedly improved steels well suited for the tough jobs of industry.

Most of the new National Emergency steels . . . designed to conserve these critical alloying elements . . . take advantage of the beneficial effects of small amounts of chromium (0.20–0.60%). For many special applications, however, higher chromium steels are used.

We do not make steel, but for more than 35 years we have produced ferro-alloys used in making alloy steels. Our research laboratories and service engineers are continually working in cooperation with steel producing companies on problems in the development and manufacture of alloy steels. If you have a problem in the selection or use of alloy steels, call on us.

Airplane propeller blades must withstand vibration and fatigue. Like certain other aircraft engine parts, they are frequently made from steels containing about 1% chromium and about 0.15% vanadium.

BUY UNITED STATES WAR BONDS AND STAMPS



Ball Bearings for equipment that must move freely and quickly must resist abrasive wear, and keep true shape. Most precision ball bearings are made of 1.2-1.5% chromium steel with 0.2-0.5% manganese.

Marine Engine Crankshafts for patrol vessels take a terrific pounding. Men's lives depend on their durability and strength. These crankshafts are frequently made from a 1.0% chromium steel with manganese, nickel, and molybdenum.

Truck Gears must be tough, durable and wear resistant. Gears, steering knuckles, springs, pinions, and many other truck parts are now being made from steels containing up to 1% chromium with less amounts of other elements.

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Unit of Union Carbide and Carbon Corporation
30 East 42nd Street New York, N. Y.
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Electromet
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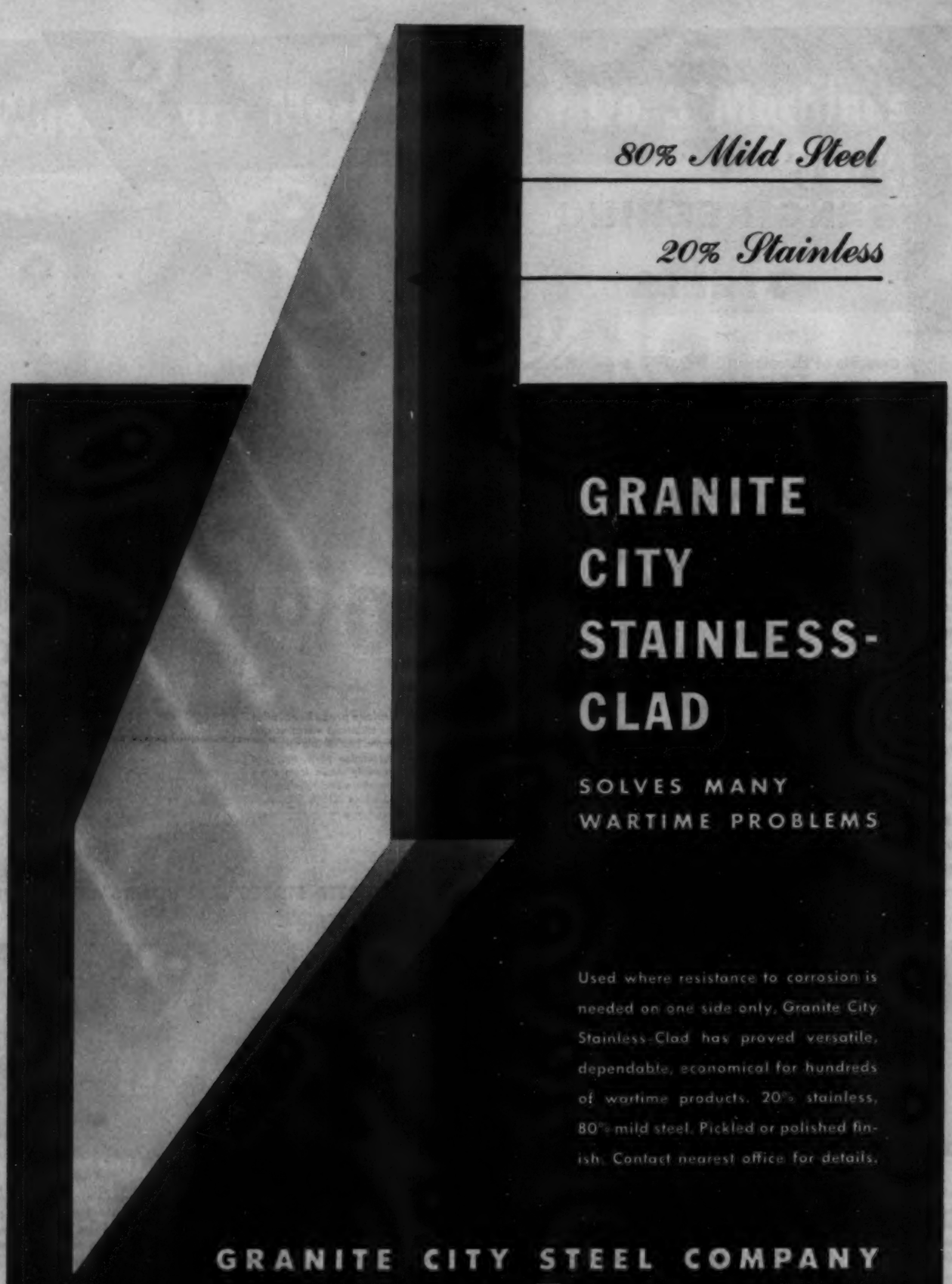
80% Mild Steel
20% Stainless
GRANITE CITY STAINLESS-CLAD
SOLVES MANY WARTIME PROBLEMS
Used where resistance to corrosion is needed on one side only, Granite City Stainless-Clad has proved versatile, dependable, economical for hundreds of wartime products. 20% stainless, 80% mild steel. Pickled or polished finish. Contact nearest office for details.
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THE TUBE THAT FITS!

Do you lose time putting fittings on tubes because they won't fit? • Next time, ask for Lewin-Mathes Copper Tubes. All dimensions are strictly guaranteed within standard tolerance. • With Lewin-Mathes Copper Tubing your work will run as smoothly as a clock, and you are insured against loss of time and trouble.

LEWIN MATHES

LEWIN-MATHES COMPANY • • SAINT LOUIS, MISSOURI

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Another new super-colossal G-E training film

This *new* film shows in complete detail exactly what the atomic-hydrogen welding process is, how it is used, and what it is best suited to do.

Produced by the Raphael G. Wolff Studios, under the direction of the G-E welding laboratories, it follows the same pattern which proved so successful in "The Inside of Arc Welding."*

MADE IN TWO PARTS

(16 mm—each part 10 minutes)

PART ONE describes and illustrates the fundamentals of atomic-hydrogen welding. It shows how to regulate the welding current and the hydrogen supply; how to adjust the electrode holder and the tungsten electrodes; and how to recognize and correct improper adjustment.

PART TWO shows proper technique for making corner, edge, fillet and groove welds; how to control the molten pool; and how to make sure of proper penetration, good fusion, and uniformity. Particular emphasis is given these four factors—current setting, speed of travel, size of arc, and the contact of the arc with the work.

**More than 2400 reels of "The Inside of Arc Welding" are now in regular use.*

YOU CAN BUY these films at print cost; that is, $52.00 per part, or—
YOU CAN BORROW prints for a single showing, without cost except for transportation.

Simply contact your G-E arc-welding distributor or mail the coupon to the nearest address listed.

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140 Federal St., Boston, Mass.
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GENERAL ELECTRIC

ATOMIC-HYDROGEN ARC WELDING

SKILLED OPERATORS show exactly how the atomic-hydrogen welding process is used. In the scene above an operator demonstrates the proper application of filler metal.

PROPER ADJUSTMENT of the atomic-hydrogen holder, the hydrogen supply and the welding current is clearly illustrated. Each step is shown by close-up photographs.

THE ATOMIC-HYDROGEN ARC and molten pool are shown in full detail—by the new technique developed by the Raphael G. Wolff Studios of Hollywood.

FINISHED WELDS of typical joints are illustrated by surface and cross-sectional photographs. The causes of both good and bad welds are fully explained.

THIS COUPON IS YOUR KEY TO FASTER TRAINING

JOE MaGEE, General Electric Co., Dept. 673-49

.....
(nearest address)

☐ **Enclosed is our order for "The Inside of Atomic-hydrogen Arc Welding," Part 1 and Part 2.**
(We understand that if we are not completely satisfied we may return the films within five days, and our order will be cancelled.)

☐ **Please reserve Parts 1 and 2 for our use on date indicated:**

1st choice..... 2nd choice.....

.....
(Organization)

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(Your name)

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(Street address)

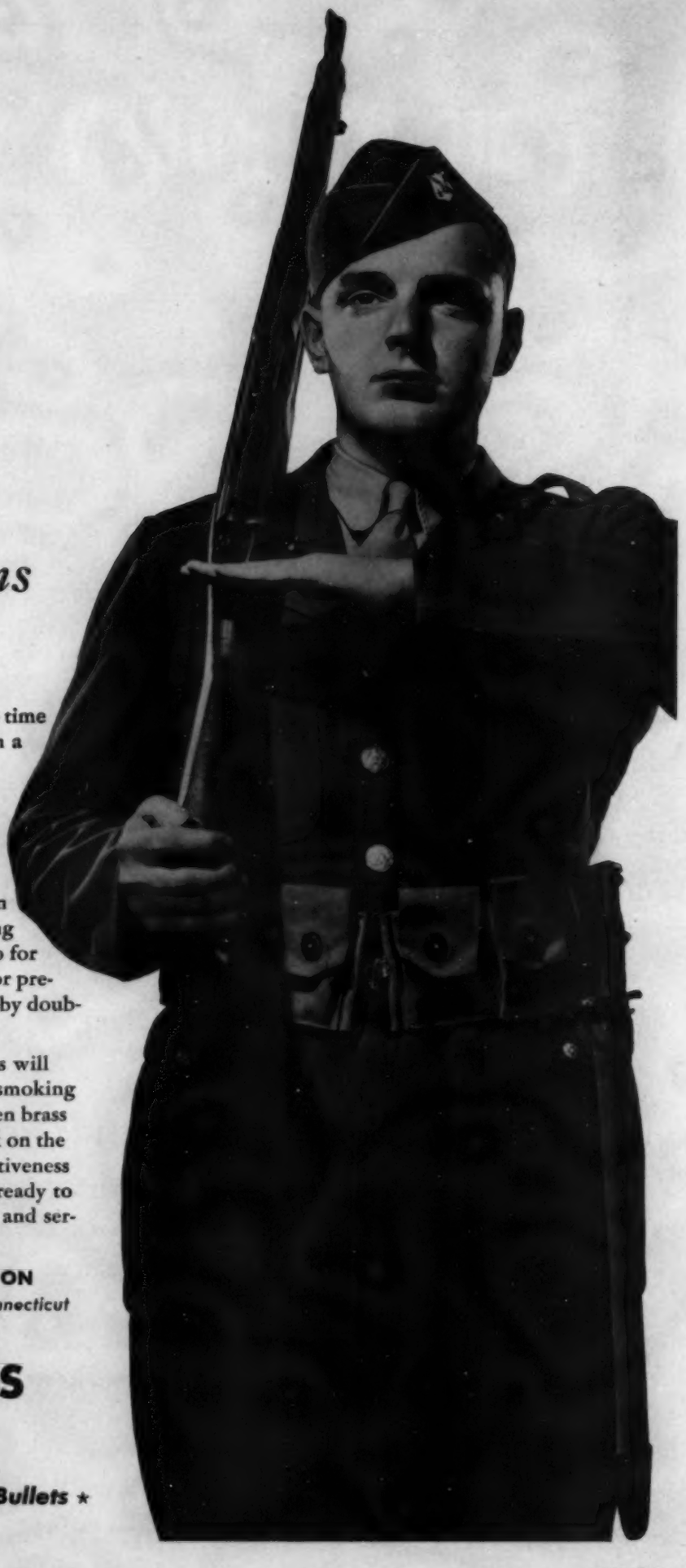
.....
(City) (State)

BRASS

Salutes its

Comrades-in-Arms

★ ★ ★



One of the major military metals since the time of the Roman Conquest, brass again is on a tour of duty along all the far-flung battle-fronts of the United Nations.

So brass is not now available for all the jobs on which its special qualities have always made it the standard material specification. Many of these jobs have been assigned to other materials, which are doing yeoman service, and will continue to do so for the duration. To them, a sincere salute for preventing a breach in the Service of Supply by doubling for brass during the war emergency.

For its own part, on the front lines, brass will continue to "keep 'em firing" until the last smoking shell-case snaps out of the gun-breech. Then brass will resume its traditional peacetime work on the jobs that can be done with fullest effectiveness *only by brass.* And Bristol, then, will be ready to put to work for you the many new ideas and services developed during the war years.

THE BRISTOL BRASS CORPORATION
Makers of Brass since 1850, at Bristol, Connecticut

BRISTOL BRASS

★ ***Buy War Bonds to Buy Brass for Bullets*** ★

You Name the Part —

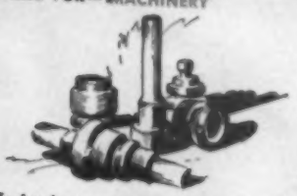
Probably we make it

Brake Shoe **MAKES PARTS FOR MANUFACTURERS . .** Parts in many kinds of metals and metal alloys, compositions and fabric . . . parts that are cast, upset, drop forged and molded. In war as in peace, Brake Shoe ships millions of parts to thousands of manufacturers, in many fields of industry.

The services of our research and development engineers are available for immediate or post-war problems.

AMERICAN BRAKE SHOE COMPANY, 230 PARK AVENUE, NEW YORK

PARTS FOR— MACHINERY



Meehanite castings, upset and drop forgings, bearings. Manganese steel gears, sheaves. Pressure castings.

PARTS FOR— EXCAVATING

Placer dredge buckets, dredger and power shovel dippers. Quarrying, mining equipment parts. Bronze bearings.

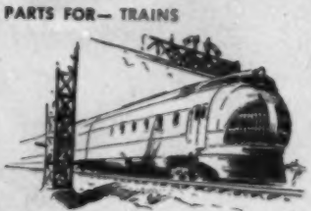
PARTS FOR— SHIPS

Brass and non-metallic bearings. ABK bearing wheels. Air compressors. Parts for all types of ships.

PARTS FOR— GUNS

Upset forgings, non-ferrous parts for naval and field guns. Liners, gear blanks, parts for gun assemblies.

PARTS FOR— TRAINS



Brake Shoes and Meehanite castings. Manganese steel center and wear plates. Journal bearings.

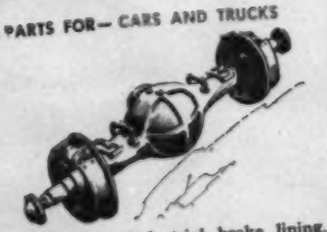
PARTS FOR— TANKS

Forged shafts, transmission parts, brake levers, drain valve cages, armor plate castings. Bronze bearings.

PARTS FOR— PLANES

Propeller hubs, machined parts for engines, retractable landing gears. Non-ferrous castings and forgings.

PARTS FOR— CARS AND TRUCKS



Automotive, industrial brake lining, axle, gear blank forgings, fan belts, clutch facings. Garage equipment.

AMERICAN

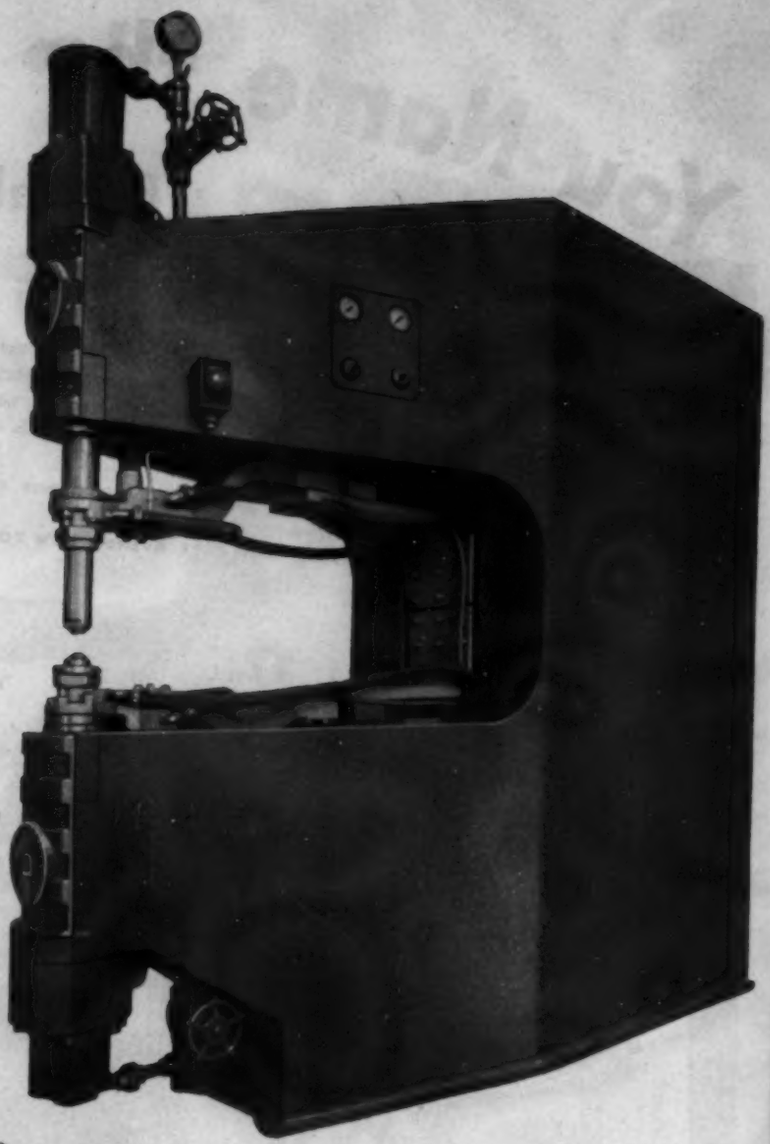
Brake Shoe

COMPANY

58 PLANTS SERVING INDUSTRY AND TRANSPORTATION

American Brakeblok Division ..... Detroit, Mich.	Kellogg Division ..... Rochester, N. Y.
Ramapo Ajax Division ..... New York City	American Forge Division ..... Chicago, Ill.
American Manganese Steel Division . . . Chicago Heights, Ill.	Southern Wheel Division ..... New York City
Brake Shoe and Castings Division ..... New York City	National Bearing Metals Corp. ..... St. Louis, Mo.

FOR SHIP-BUILDING—The "Temp-A-Trol" welder (right) has a maximum throat depth of 44 inches. It will handle the heat-treated welding of plates far beyond the thickness ordinarily considered practical for spot-welding.

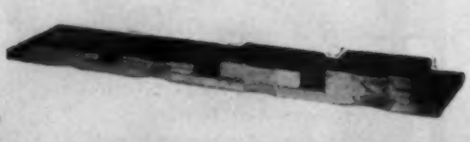


The Newest thing in Welding

"TEMP-A-TROL"

- **Combines resistance welding and heat-treating of welds**
- **Automatic thermo-couple control of weld-cycle**
- **Ideal for heavy sections and alloy steels**

Send for Bulletin No. 301 on your company letterhead for complete information



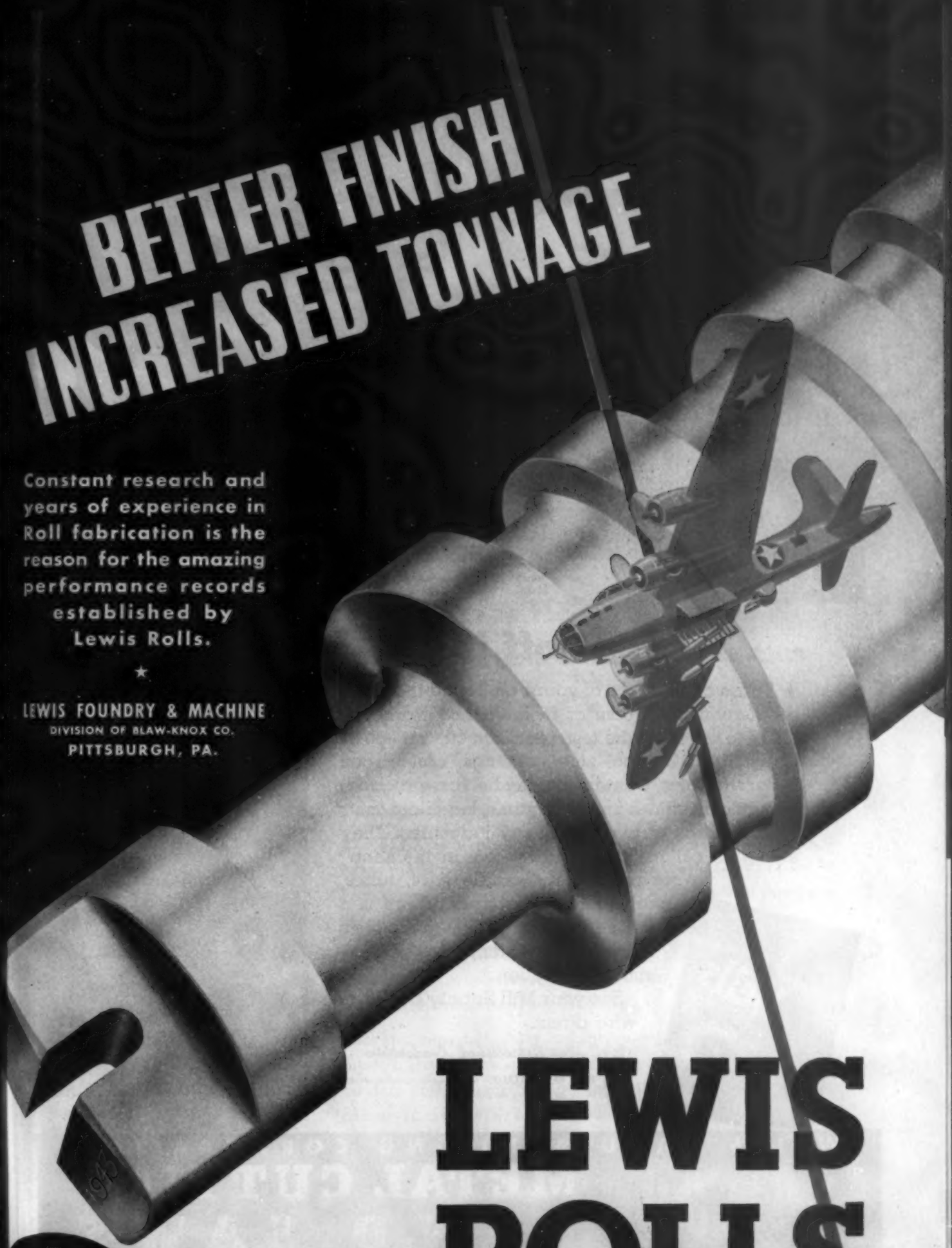
The self-compensating "Temp-A-Trol" will weld a series of different sections like this without changing the machine setting.

PROGRESSIVE WELDER CO.

SEAM PROJECTION & BUTT . . . *Electric Welding Equipment* . . . PORTABLE GUN & PEDESTAL

3050 E. OUTER DRIVE • DETROIT, U. S. A.

BETTER FINISH INCREASED TONNAGE



Constant research and years of experience in Roll fabrication is the reason for the amazing performance records established by Lewis Rolls.

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DIVISION OF BLAW-KNOX CO.
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Wells No. 8

for Smooth, Accurate Action

WELLS No. 8
Capacity: Rectangle .... 8" x 16"
(spec. bowed guides) .. 5" x 24"
Rounds ..... 8" dia.
Speeds: ft. per min. 60, 90, 130
Motor. ... Specifications optional

...on cut-off jobs!

★ Those cutting jobs of yours, on 'round-the-clock production, tool room or maintenance work, are made to order for the fast, precision cutting action of a Wells. On tool steel, castings, non-ferrous metals, plastics, whatever it may be, these rugged, versatile machines are saving time, labor and costs for hundreds of plants in many industries. They are often called "the handiest tool in the shop" for they easily handle bars, tubes, angles and odd shapes. There is a size to suit your needs — for today's wartime job and tomorrow's peacetime competition.

See your Mill Supply Dealer or wire direct.

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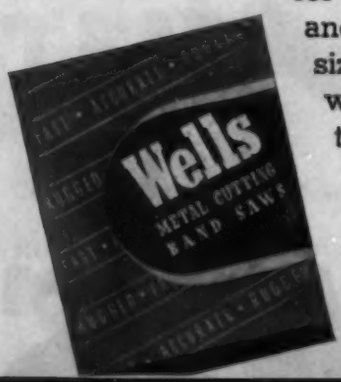

THIS NEW CATALOG will give you complete details. Write for it today. No obligation.

No. 20
Designed for cutting risers off propeller blades.

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Heavy duty production Saw.

STOCK STANDS
Indispensable item for your shop.

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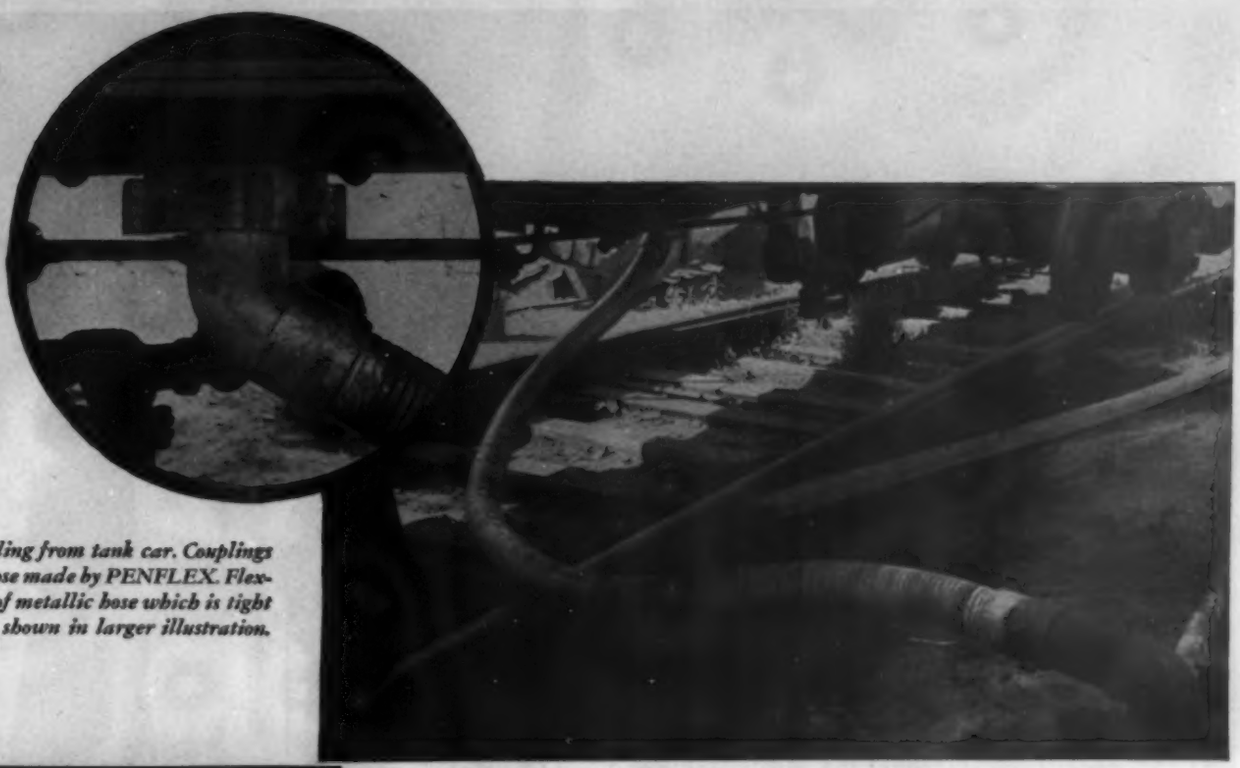
Wells METAL CUTTING BAND SAWS

1515 FILLMORE STREET • THREE RIVERS, MICHIGAN



Unloading from tank car. Couplings and Hose made by PENFLEX. Flexibility of metallic hose which is tight as pipe shown in larger illustration.

Four-Wall Interlocked Construction in sizes 1" to 18" I. D. In various metals and alloys . . . coated and uncoated.

Here is Hose to Handle *Styrene* and other Synthetics

"Double interlocked type hose is best suited for handling Styrene since it contains what is commonly known as a benzine ring." So states a letter from a large synthetic rubber manufacturer who ought to know, since he also manufactures other mechanical rubber products.

PENFLEX is wound in a continuous helix, from strips of heavy metal which resists attack from a wide range of liquids. Four metal walls—*tight as pipe*—reduce danger of puncture; four metal walls interlock to resist crushing.

Great flexibility, accomplished by PENFLEX sliding, interlocking joint construction—*the metal itself does not bend*—provides freedom from kinks.

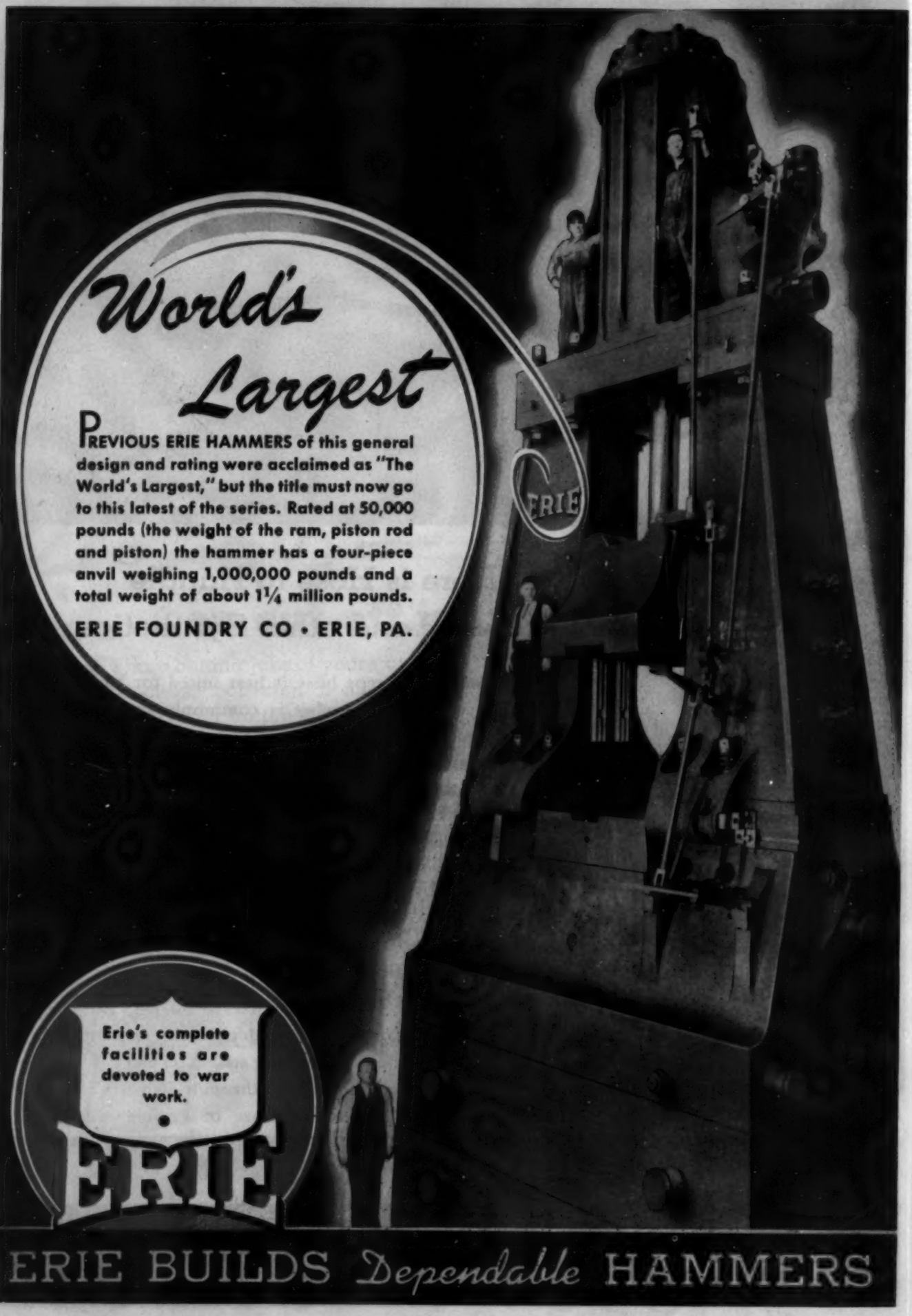
Perhaps you, too, have an unusual problem in handling liquids. If so, write our engineering staff. You can get helpful data and information gathered through 40 years' experience in research and manufacture of flexible metallic hose and tubing.

PENFLEX METAL HOSE

PENNSYLVANIA FLEXIBLE METALLIC TUBING CO.

7219 Powers Lane, Philadelphia, Pa.

ESTABLISHED 1902


World's Largest
PREVIOUS ERIE HAMMERS of this general design and rating were acclaimed as "The World's Largest," but the title must now go to this latest of the series. Rated at 50,000 pounds (the weight of the ram, piston rod and piston) the hammer has a four-piece anvil weighing 1,000,000 pounds and a total weight of about 1¼ million pounds.
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Erie's complete facilities are devoted to war work.
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"SO WE'VE GONE SOFT, HAVE WE?"

"Axis leaders say it's so...because we make electricity do our hard work. That's a laugh! But, let 'em go on thinking it. They'll learn the cold, hard facts soon enough."

You can say *that* again, Jim!

We'll take our exercise the pleasant way. But when it comes to getting heavy loads from here to there, we'll let George Kilowatt do it! That's the fast, easy, low-cost way.

For over half a century we've been proving just that. And we've been doing some *im*proving, too! For example, this five-step, variable speed control for P&H Hevi-Lift Hoists gives you the change of pace to meet every requirement for speed in lifting, lowering, or travel. And you do it just by pressing buttons.

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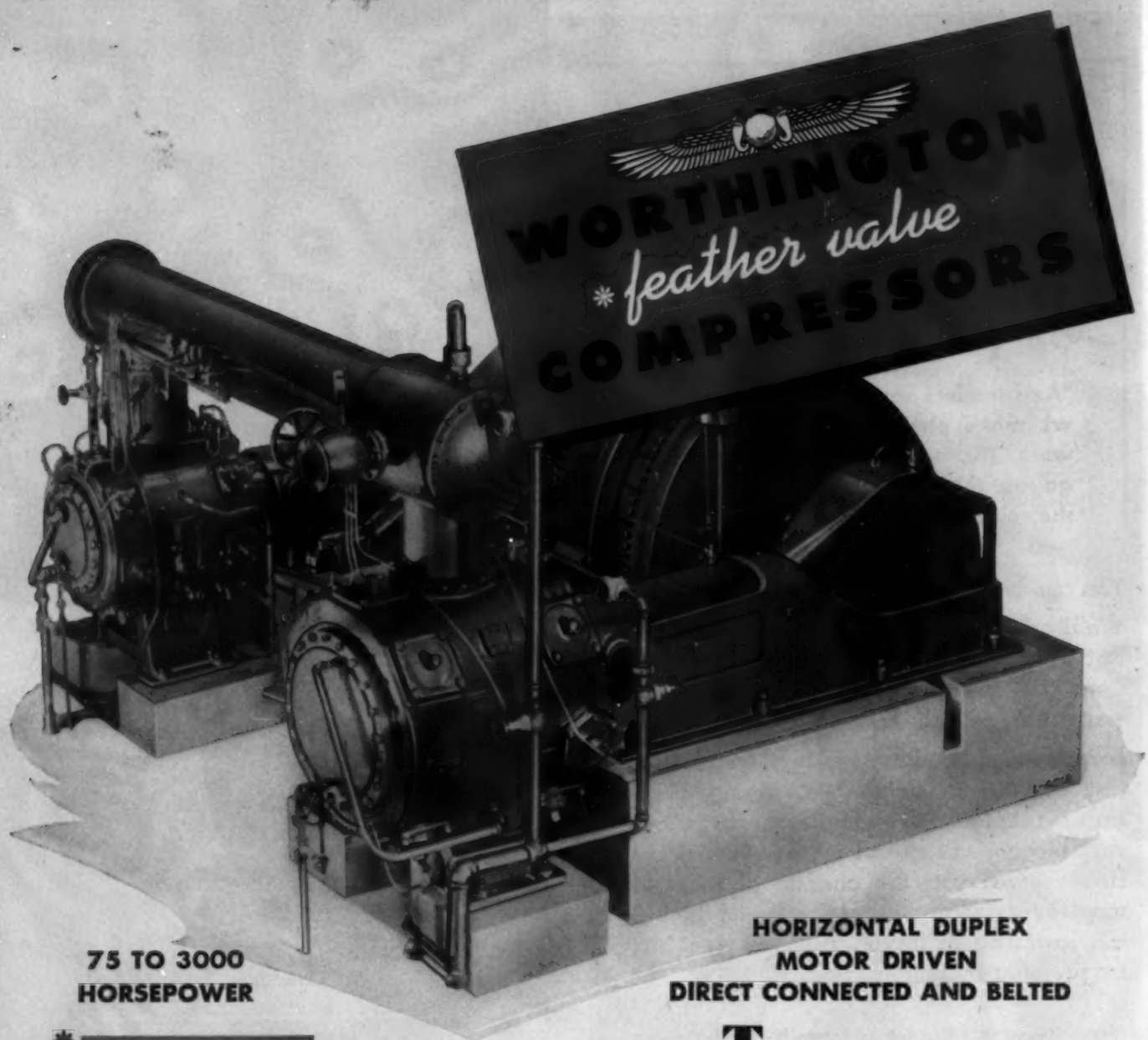
P&H HEVI-LIFT HOISTS

Offered in all capacities up to 15 tons with a wide variety of mountings. Standard equipment includes full magnetic push-button control. Write for literature.

★

ARMY E NAVY

A new star has been added to P&H's award for excellence in war production.



75 TO 3000 HORSEPOWER

HORIZONTAL DUPLEX MOTOR DRIVEN DIRECT CONNECTED AND BELTED

* **Only Worthington Compressors are Feather Valve equipped**

Simplest . . . lightest . . . most efficient valve yet devised for compressor service.

- Each valve consists of light strips of steel whose easy flexing permits passage of air
- No cushioning device required
- Strips seat by contact . . . not impact
- Unusually light . . . due to flexibility of strips
- Minimum air friction . . . result, minimum power consumption due to flexibility, large lift area and light seating
- Maximum accessibility . . . removable in five minutes . . . replaceable in eight
- Intake and discharge valves complete are interchangeable
- Negligible maintenance . . . nominal expense for valve strip renewal at long intervals

*Reg. U. S. Pat. Off.

Thousands of horsepower of Worthington compressors are now carrying vital parts of the United Nations' war production load.

Among the most important of their many noteworthy features is their FEATHER VALVE equipment . . . giving high volumetric efficiency and smooth, quiet operation, and contributing largely to the remarkable dependability, negligible maintenance and long operating life reported by prominent users in every field and under the most exacting conditions.

Both the Navy E and Army-Navy E Awards have been presented to Worthington for speed and excellence in production.

AC3-4

WORTHINGTON PUMP AND MACHINERY CORPORATION • HARRISON, NEW JERSEY

War plants throughout America are obtaining more production per man hour wherever sheet metal must be squared, trimmed or cut into strips. The above photograph gives an "operator's eye view" of one of the latest type Niagara Power Squaring Shears. The entire machine is arranged for convenient operation, quick, accurate setting of ball bearing, self-measuring, parallel back gage, full visibility of cutting line and many other features which speed up shearing. Niagara Power Squaring Machines are built in a complete range of sizes and capacities.

Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory regrinding service by the same skilled men who grind new Niagara knives.

NIAGARA MACHINE & TOOL WORKS

BUFFALO, N. Y.

DISTRICT OFFICES: DETROIT, CLEVELAND, NEW YORK

Official U. S. Navy Photograph — Photo Courtesy Kearney & Trecker Corp.

A worker on the "heat-treat front" of a machine-tool plant, quenching a batch of gears for war-production milling machines. Gears have just been Homo-carburized in the furnace behind the man.

Fighting For Better Carburizing? You Can Win by the Homocarb Method!

Many a plant which faced a bottleneck in quality carburizing is now in full war-production stride because the Homocarb Method was adopted. Makers of machine tools, airplane parts and engines, tanks, trucks and guns have found that Homo-carburizing ends all rejects even on parts which are, by previous standards, difficult to treat.

The gears shown here are typical. Made of SAE 4615 (nickel-moly) steel, they require a carburized case specified to be between 40 and 50 thousandths of an inch, prior to finish-grinding. A batch of six gears, weighing 480 lb, is carburized at 1675 F, and quenched immediately it leaves the furnace. Its case is uniformly 45 thousandths thick, and retains the full uniformity of texture permitted by the steel stock. When cool, the gears are tempered in a Homo furnace, not shown in the photo. This treatment eliminates any hard spots which might have been present, so that the finish-grinders cut rapidly and smoothly, producing a finish which more than meets the rigid specifications of the machine-tool builder. As far as we have heard, no reject in this plant has ever been charged to either Homo Carburizing or Homo Tempering.

An experienced heat-treater requires only a few hours to master the operation of Homocarb Method equipment. It gives him automatic control of the four factors which he must consider in the heating cycle; namely, quality of carburizing gas, quantity of gas, temperature of carburizing and time of carburizing. With these factors under his control, the man applies his skill and knowledge to best effect; the work is speeded up and uniform results are maintained.

To receive engineering information on the application of Homocarb or Homo Tempering to a wartime problem, just outline the problem to us. Or, if you prefer, we'll send catalog on request.

Homo-carburized gears, immediately after quenching and before quench oil is removed. Note smooth, scale-free surfaces. These are nickel-moly gears; carburized case is uniformly 45 thousandths thick.

Jrl Ad T-623(14)

LEEDS & NORTHRUP COMPANY, 4957 STENTON AVE., PHILA., PA.

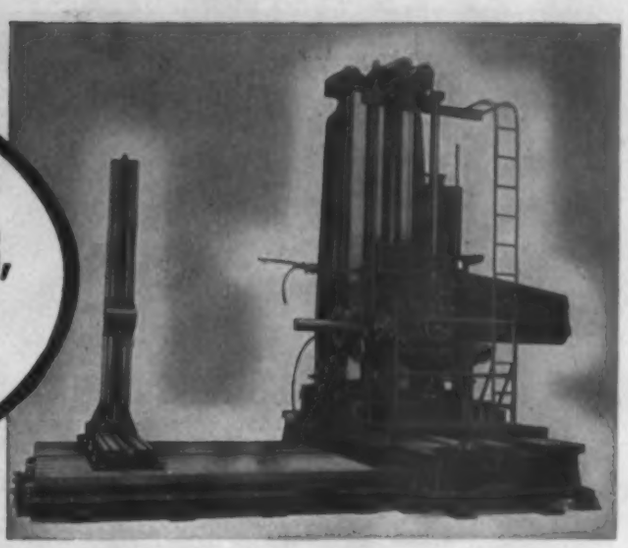
LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

OHIO

HORIZONTAL BORING, DRILLING, MILLING MACHINES *and* REVOLVING TABLES

OHIO STEP UP PRODUCTION

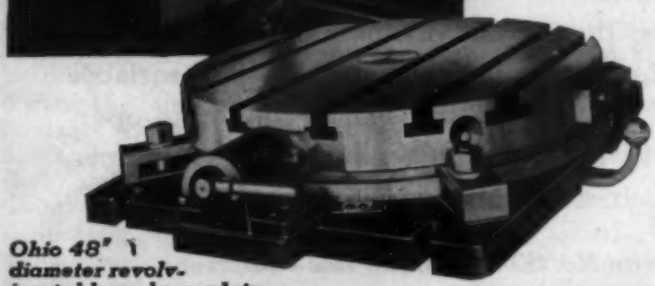


Ohio Horizontal Boring, Drilling and Milling Machines are furnished in 5" and 6" spindle sizes in both table and floor types. Extra heavy duty floor type is illustrated above.

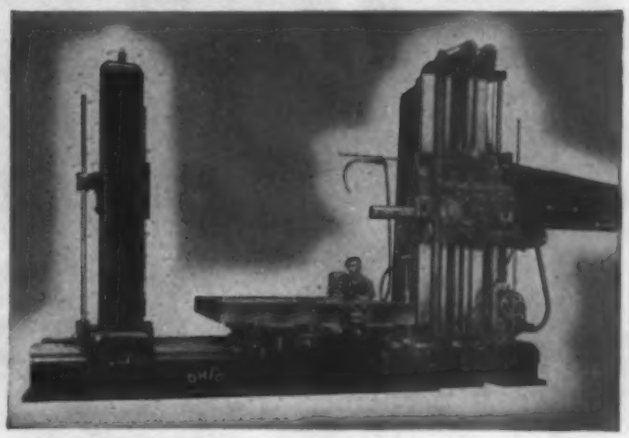
Ohio Horizontals are built by a company which has served the metal-working industry since 1887 and which brought out the first all-anti-friction horizontal boring mill to appear in this country. Today, Ohio Horizontals are doing a notable job in production lines where high output must be combined with extreme accuracy. Ask for Bulletin 300 . . . Ohio Revolving Tables are high grade precision units graduated in half degrees. Round and square types are available from 24" through 96" in many combinations. Get our new well illustrated 12-page bulletin.

THE OHIO MACHINE TOOL COMPANY, KENTON, OHIO

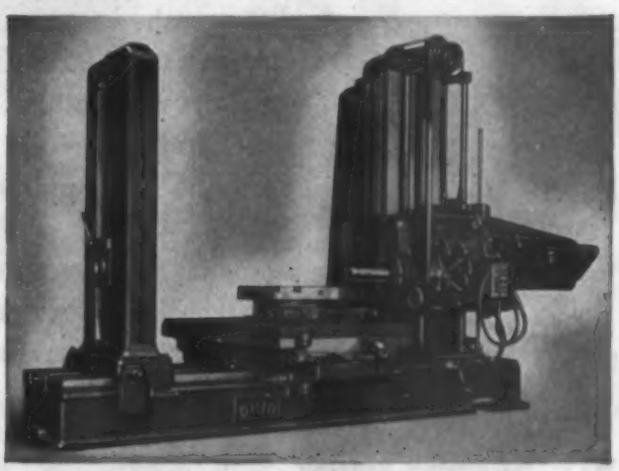
• OHIO 48", square worm feed revolving table with anti-friction raising device and index pin and four stops.



Ohio 48" diameter revolving table on base plate with anti-friction raising device and index pin with four stops.



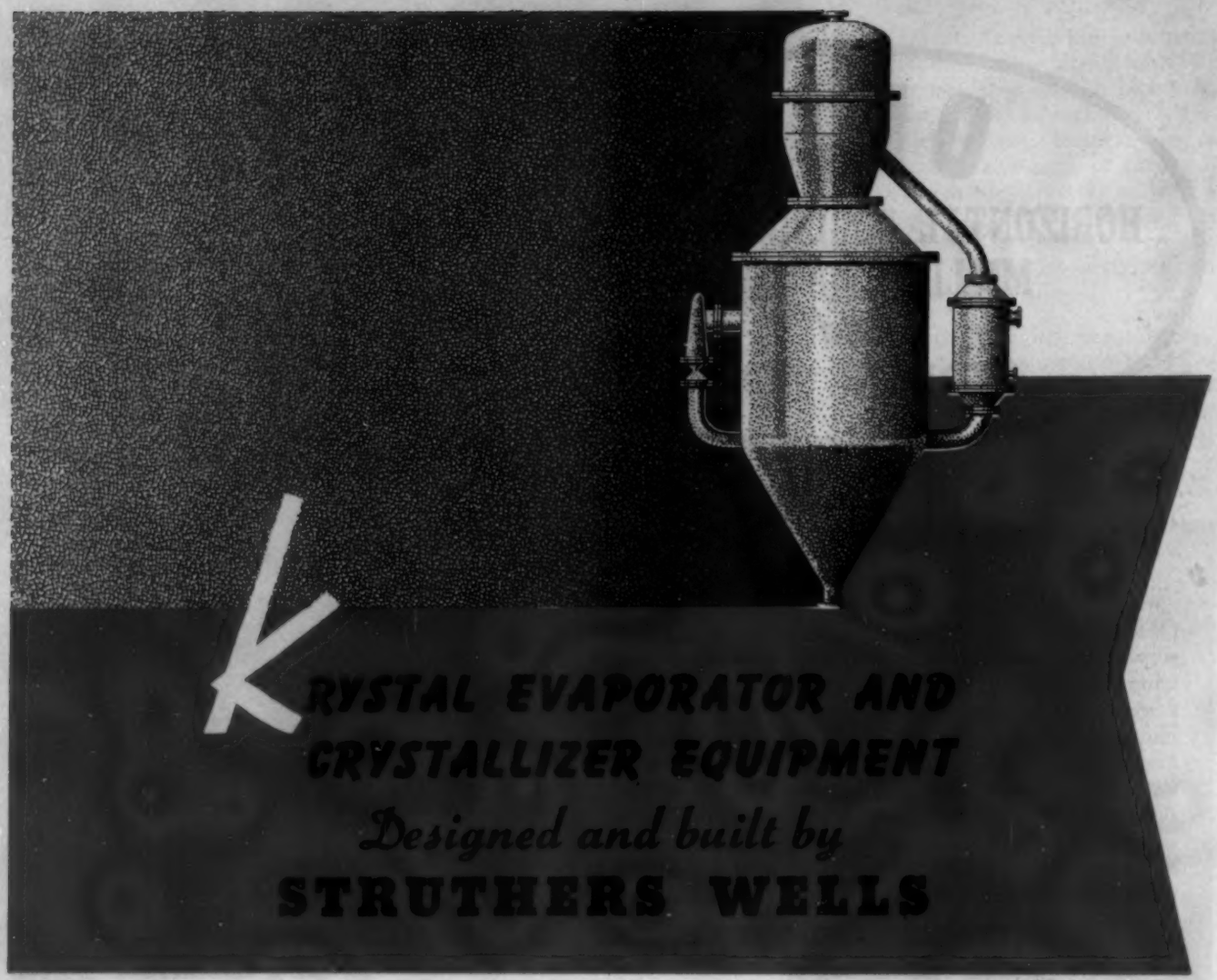
Ohio Dreadnaught extra heavy duty table type has portable control, making for quick, convenient operation. 72" x 144" table. 60" wide bed.



Extra heavy duty table type with 48" x 84" table, 43" wide bed and threading attachment.

OHIO DREADNAUGHT

HORIZONTAL BORING, DRILLING AND MILLING MACHINES • SHAPERS • PLANERS



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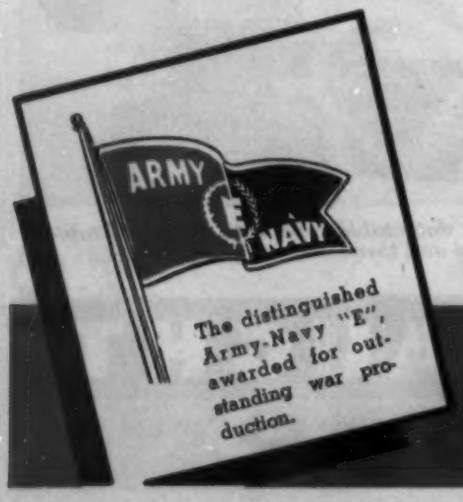
Designed and built by

STRUTHERS WELLS

Krystal equipment marks a distinguished technological advance in the field of evaporation and crystallization. Coupled with Struthers Wells' broad experience and unique fabricating facilities, this development offers a service of great importance to the process industries.

Features of this new evaporator and crystallizer equipment include exceptionally uniform crystals . . . high purity product . . . variable crystal size . . . efficient separation of crystals and mother liquor . . . clean heating and cooling surfaces . . . plus many desirable operating economies that will prove important to you.

Bulletin No. 50 describing this equipment will be sent on request



The distinguished Army-Navy "E", awarded for outstanding war production.

STRUTHERS WELLS CORPORATION

PROCESS DIVISION

PLANTS AT WARREN, PENNA., AND TITUSVILLE, PENNA.

Short Cuts to quicker hauls

AMERICAN railroads now are carrying nearly twice the gross ton-miles of freight they were hauling three years ago . . . and they are breaking all records in passenger traffic. This amazing wartime performance is neither a miracle nor a military secret. It is the result of hard work, skillful coordination, careful maintenance — and a far-sighted engineering program on the part of management that prepared the railroads for today's emergency.

A dominant feature in this long-range planning has been the erection of modern bridges to shorten circuitous routes, eliminate flood hazards, and improve traffic integration. How fortunate it is for our nation's war effort that many of these projects were completed before Pearl Harbor!

American Bridge has built many of these strategic structures. For example, the massive high-level bridge above is the main link in an important cutoff which shortened trackage by 3½ miles and kept it clear of flash floods. The double-deck cantilever bridge shown was erected as part of railroad and highway relocations made necessary by a huge water-power and irrigation project. The bascule bridge replaced an old swing span, providing a wider navigation channel and speeding both rail and river traffic because of a sharp reduction in opening and closing time.

We are glad to have had a part in projects which contribute so greatly to the wartime usefulness of America's railroads. And we look forward to the time of peace when all our resources and facilities will again stand ready to serve the railroads in meeting their post-war tasks and responsibilities.

AMERICAN BRIDGE COMPANY

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no pits...

no burns...no errors!

Harmful overloads are doomed to defeat when electrical circuits are protected with Westinghouse "De-ion" Circuit Breakers.

Momentary overloads are passed without interruption; but before any disturbance can become dangerous, the sensitive Bi-metal element goes to work, *quick!* The circuit's broken, the arc quenched, in the blink of an eye.

Contact points are protected against severe pits and burns. The "De-ion" arc quencher draws the arc into the chamber, divides and smothers it in half a cycle. Contacts last longer; require less maintenance. And service is just as easily restored.

Once the condition causing the disturbance has been corrected, a simple flip of the indicating handle restores the circuit . . . in seconds. No waiting for a maintenance man; no parts to repair or replace.

Protect equipment and circuits with Westinghouse "De-ion" Circuit Breakers. Ratings up to 600 amperes; enclosures for practically every type of service. Get in touch with your local Westinghouse representative today. Westinghouse Elec. & Mfg. Co., E. Pgh., Pa., Dept. 7-N.

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Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

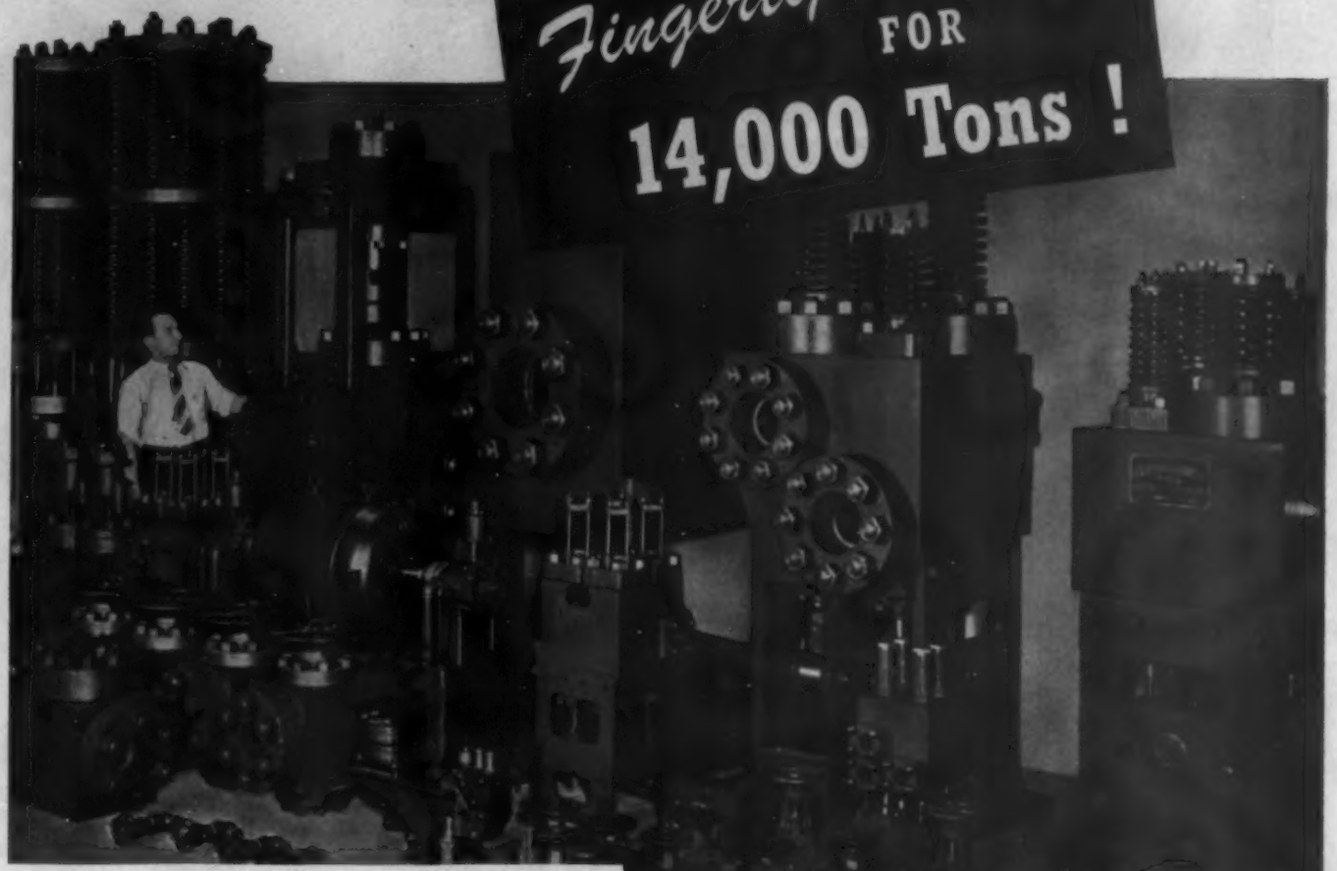
"DE-ION" CIRCUIT BREAKERS

"IN THERE PITCHING" is this Westinghouse Bi-metal element. Two metals which react differently under heat are bonded together. Threatening overloads cause this Bi-metal to bend, tripping the interrupting mechanism, opening the circuit.

CATCHING THE "HOT ONES" is the job of this "De-ion" arc quencher. Made of parallel metal plates in the form of a grid, it draws the arc into the chamber, divides it into segments and smothers it between the plates... all in the space of half a cycle.

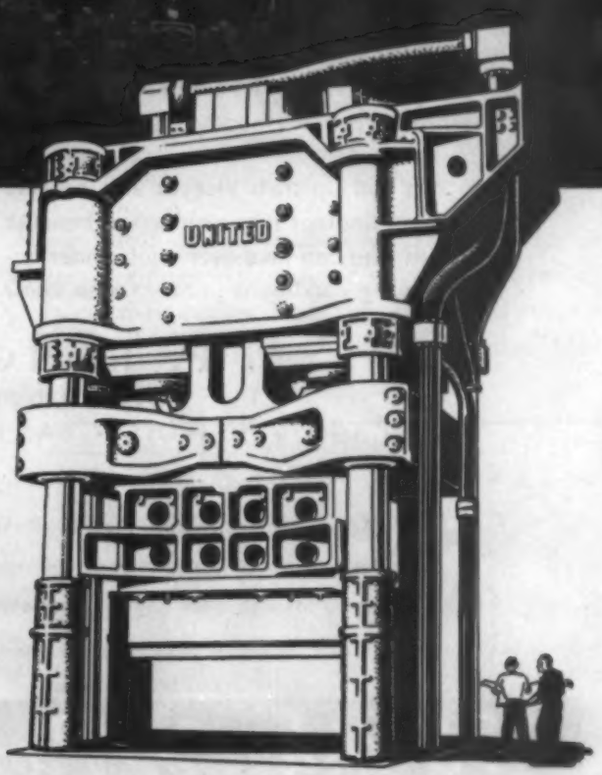
Shown here are 100,000 lbs. of **WOOD** *valves and equipment which control the entire hydraulic system of the forging press illustrated below.*

HERE'S .... *Fingertip Control* FOR 14,000 Tons !



The Wood hydraulic control system used on America's largest and fastest forging presses provides almost unbelievable control sensitivity. Without removing his hands from the control levers, the operator can obtain any press speed from zero to maximum . . . for rapid-closing, forging or opening. And this control is so sensitive as to deliver any force from a maximum of 14,000 tons down to a touch gentle enough to merely crack an egg.

R. D. Wood Company takes pride with the United Engineering and Foundry Company, the builders of this press, in this outstanding accomplishment.



R. D. WOOD CO.

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HYDRAULIC PRESSES FOR EVERY PURPOSE

SHIRT-SLEEVED RESEARCH

The word "Research" suggests glistening laboratories, microscopes beakers, test tubes, and white coats.

But Research, to be resultful, must go beyond the laboratory—out into the plants where products and processes must be proven in practice.

This requires a staff of practical engineers who can roll up their sleeves and convert laboratory findings into production benefits . . . men who can take over a job under actual working conditions . . . men who know how to run a furnace, check lubricants, solve a machining problem, process textile yarns, plan a packing design or belt a drive.

Houghton men are that kind. One hundred representatives in the field are backed up by an augmented staff of engineers available on call, and by a "proving ground" in our laboratories.

This service, offered freely to industry in the present emergency, is bringing results, which explains why plant men so often say, "Let's Ask Houghton!"

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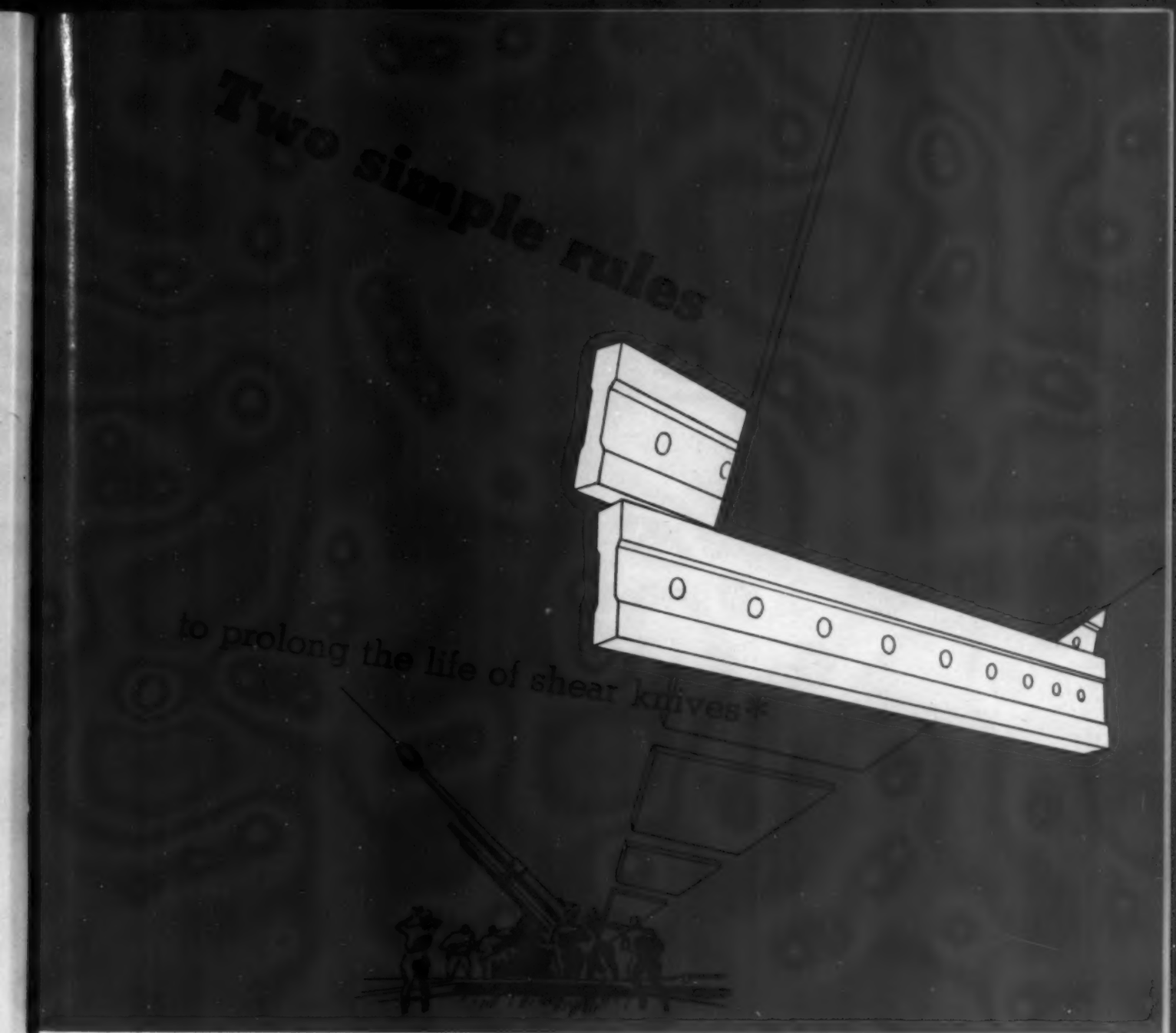
ARE YOU . . . Heat treating steel? ~ Rust-proofing metals? ~ Machining gun barrels or parts? ~ Casting magnesium or aluminum? ~ Cleaning aluminum? ~ Lubricating 24-hour plants? ~ Processing textiles? ~ Quenching NE steels? ~ Servicing hydraulic equipment?

Houghton Research experience includes all these—and more. Use it!

78 Years of Pioneering Research



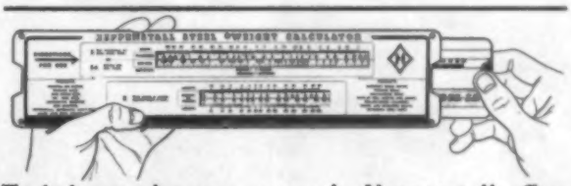
*Two things to keep in mind when you replace shear knives.

1 It's usually false economy to specify a set of knives to shear a thickness or hardness of steel for which they were not designed.

2 When the knives you order are placed in the shear, make sure the clearance between cutting edges is accurately adjusted for the thickness of steel to be cut.

Then remember this, too.

Because Heppenstall makes its own E.I.S. steel and has the largest facilities for producing solid tool steel shear knives, it can offer faster delivery at lower priority ratings. Add that to well-known diamond-H quality, and you have good reasons for specifying Heppenstall when your knives need replacement.



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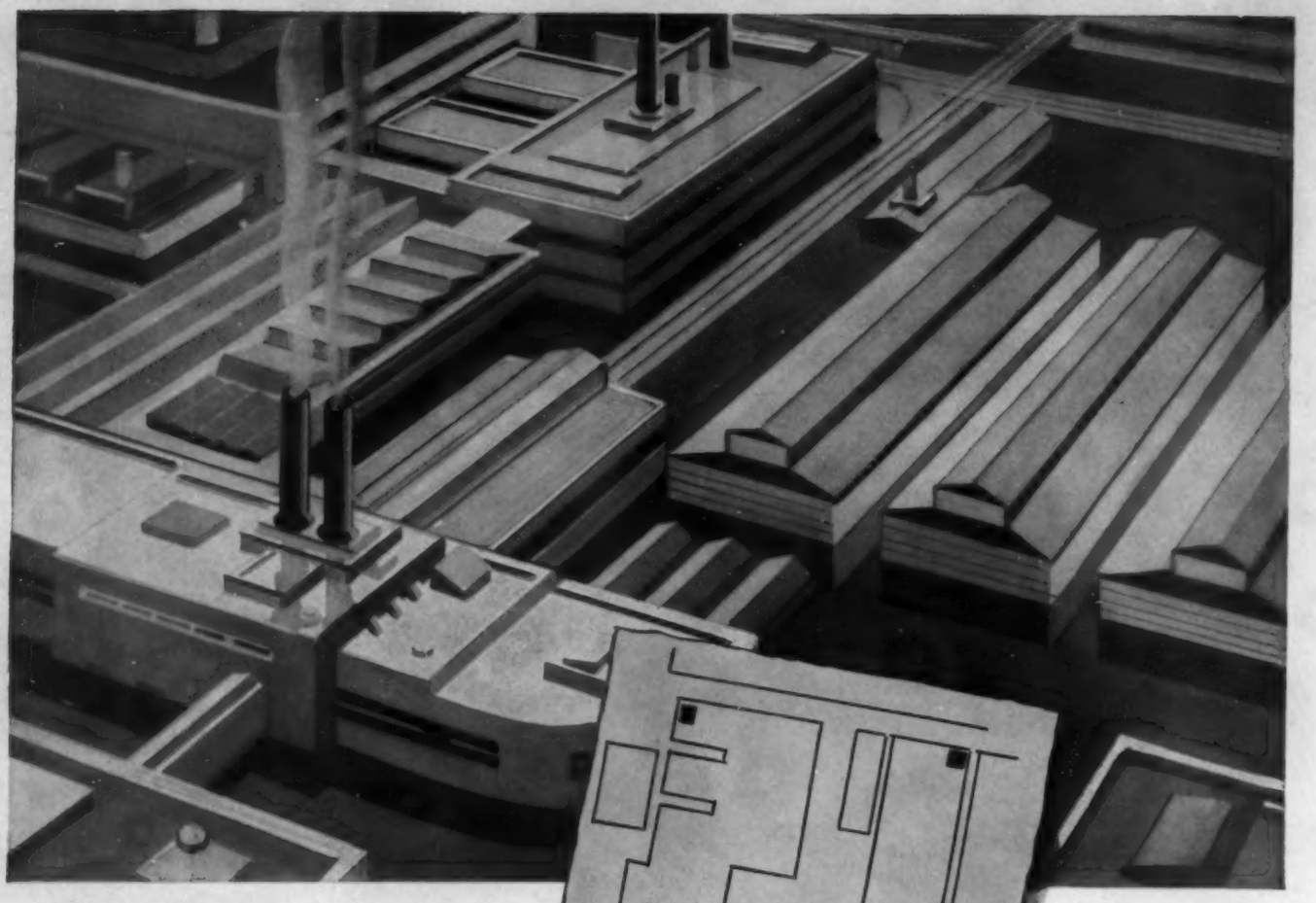

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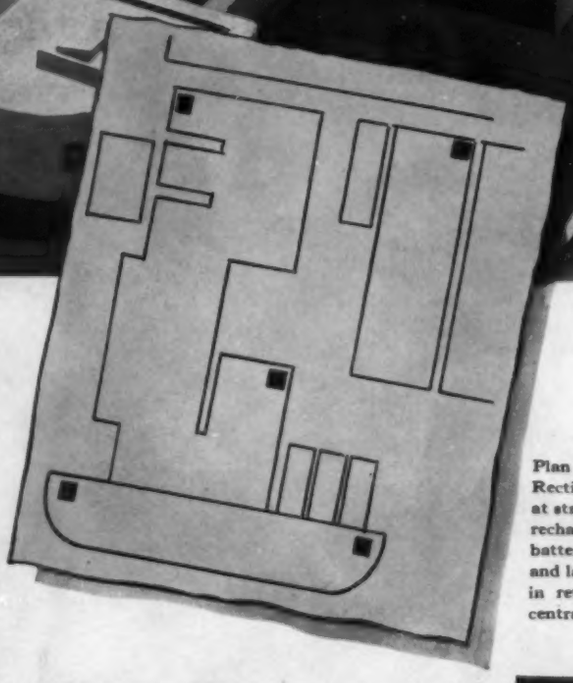

Plan shows how G-E Rectifiers were "spotted" at strategic locations for recharging electric truck batteries to save time and labor usually wasted in returning them to a central charging station.

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To "keep 'em rolling" in the air calls for GAS heat-treating

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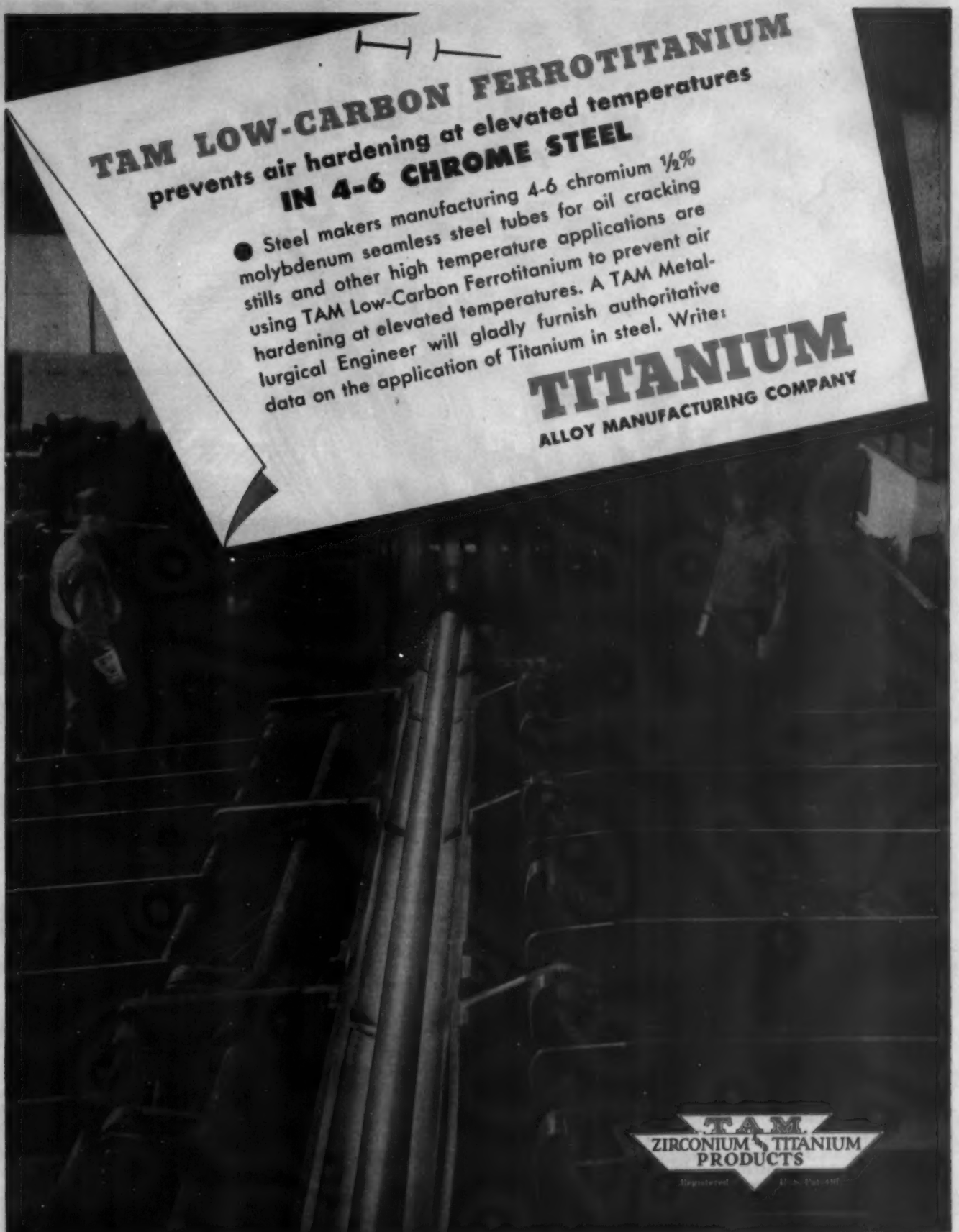
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With that curtly classic reminder, one of America's most famous research engineers replied to a man in the act of rhapsodising about the wonderful ingenuity of man.

For the barnacle, he pointed out, is a symbol of all those things that have *not* been done—a tiny marine organism that costs us millions every year—simple, "impossible" things that are still to be accomplished.

The development of lighter and stronger alloys, permitting 3, 5, or even 10 horsepower for every pound of engine weight, instead of one-to-one . . . cheaper color photographs and faster engravings and better television . . . swifter ways of making and working new super-hard alloys . . . scores of different kinds of rubber "growing" on factory floors, and fuels 3 or 4 times as powerful as 100-octane gasoline . . . even solar energy, and atomic power, and—remember the barnacle! These are but a few from a list of certainties and possibilities as long as man's imagination.

Under the secrecy of forced-draught war research, many incredible accomplishments—seemingly impossible within our time—have already occurred. For obvious reasons, these may not be discussed, but of one thing we can be certain: The end of this war will inaugurate the greatest era of industrial surprises since the age of machinery began.

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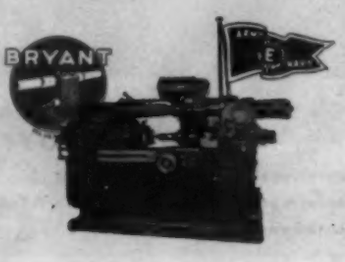

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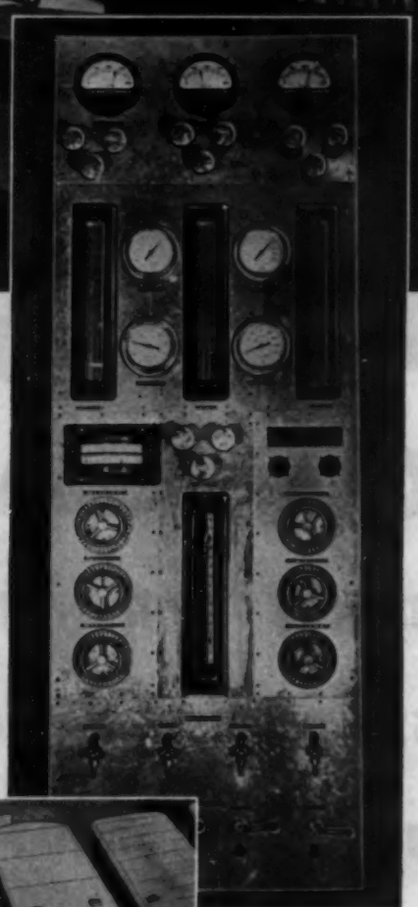

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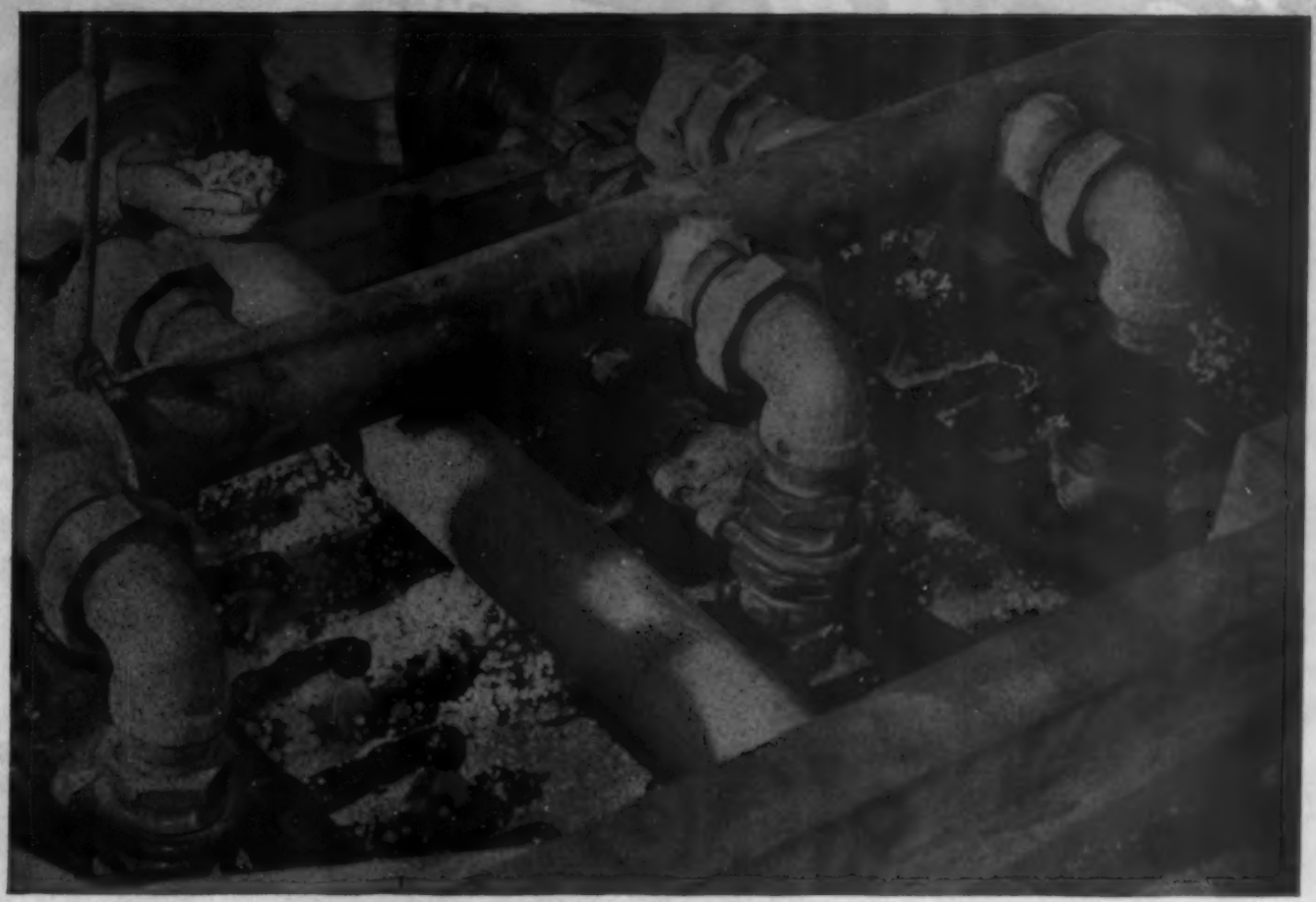

OUT OF THESE FLOCS MAY COME THE FUTURE OF THE WORLD

These white crumbs or "flocs" look very unimportant in themselves . . . but on them may depend the future of the world. They are one of the first stages in the production of synthetic rubber, the most vital material being produced in America today.

Naturally, you are interested in synthetic rubber. But synthetic rubber is only incidental. What is really important is what happens to synthetic rubber after it is actually produced. It is chemistry that makes rubber fit to use, suits it to the task at hand.

United States Rubber Company is the largest manufacturer of rubber chemicals in the world. We have worked with rubber, improved it and broadened its uses for 100 years. Today, all this tremendous fund of knowledge of the chemistry of rubber is being drawn upon to improve synthetic rubber, perfect it for the jobs it must do for the Armed Forces and war industry.

The chemistry of rubber is what determines the final compounding and processing of the flocs of synthetic rubber you see here. They may eventually go into bullet-sealing hose, air ducts, or any one of a score of other parts used in the plane that will blast the last Nip carrier off the sea. They may be made into a tire that will rumble down bomb-battered Unter den Linden. They may go into some essential equipment like a conveyor belt that will keep America's war production line moving at top speed. They might very easily determine the entire course of the war, and thereby the future of the world.

Synthetic rubber, its production, compounding and application to war and industrial uses, is too big a story to present adequately here. There are five basic commercial types of synthetic rubber. Each of them has distinct properties and characteristics. Not a single one is ideal for all purposes.

Deciding which synthetic rubber to select and use for a particular task is an equally big story, a decision that requires expert knowledge and broad range experience.

We have told the story of the five basic commercial types of synthetic rubber, our more than twenty years of experience in working with them, and our twelve years of using synthetic rubber commercially in an interesting, informative booklet for business executives. Please ask for your copy on your regular business letterhead.

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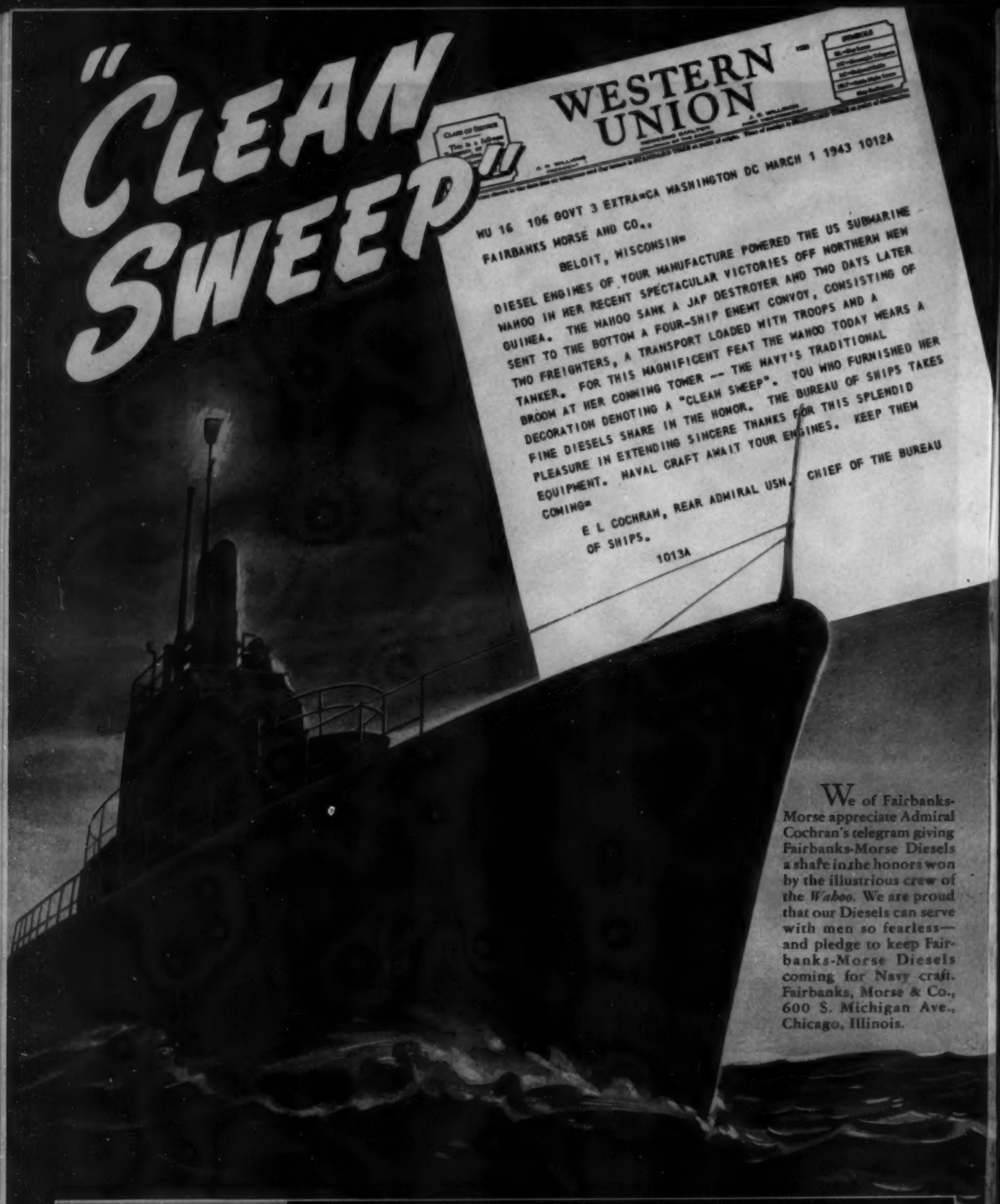
"CLEAN SWEEP"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We of Fairbanks-Morse appreciate Admiral Cochran's telegram giving Fairbanks-Morse Diesels a share in the honors won by the illustrious crew of the *Wahoo*. We are proud that our Diesels can serve with men so fearless—and pledge to keep Fairbanks-Morse Diesels coming for Navy craft. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

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Diesels

Jominy end-quench offers quick, simple test for hardenability of steel. Page 106

STEEL

The Magazine of Metalworking and Metalproducing

MAY 17, 1943

Volume 112 *Number 20*

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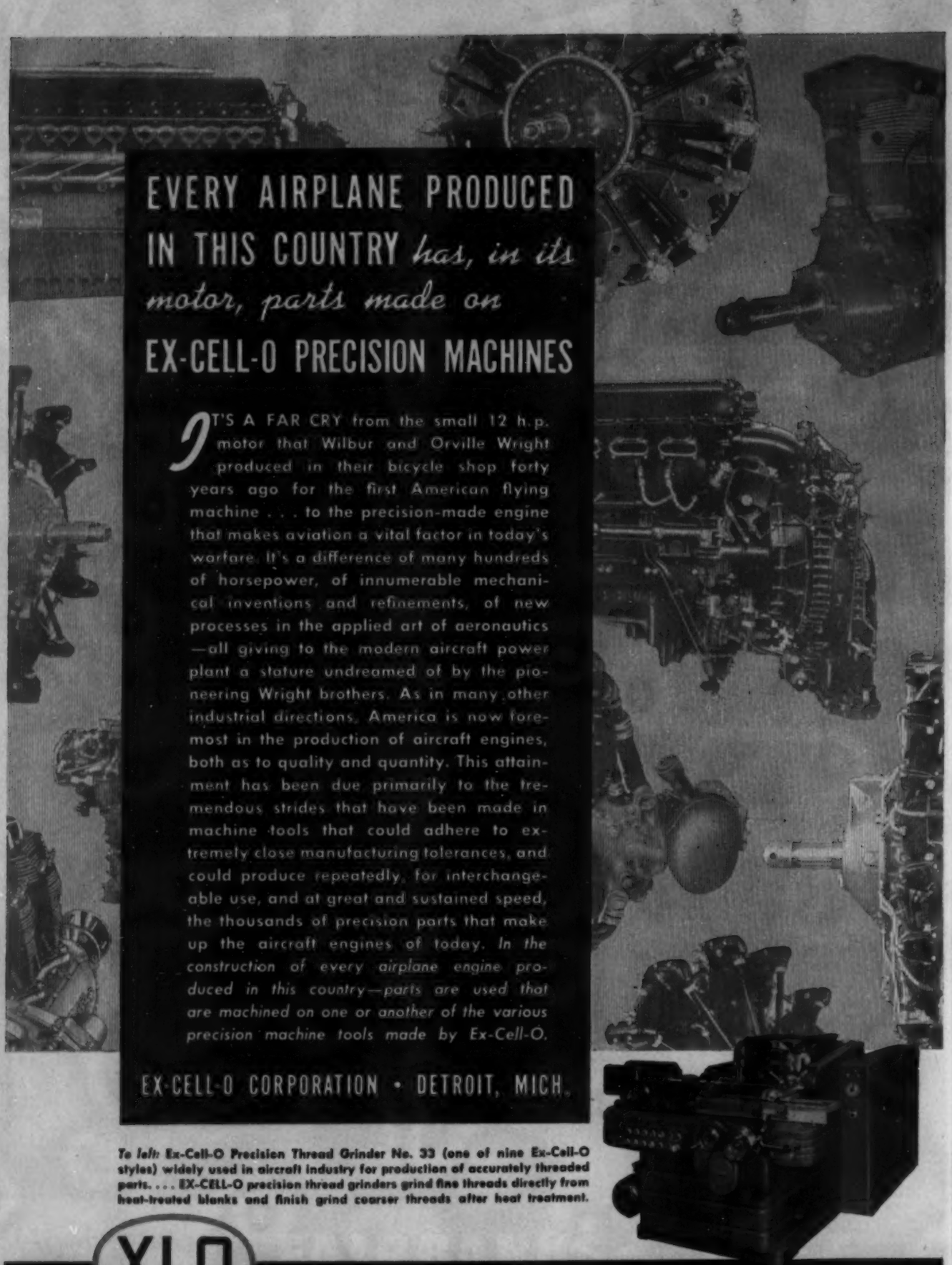

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IT'S A FAR CRY from the small 12 h.p. motor that Wilbur and Orville Wright produced in their bicycle shop forty years ago for the first American flying machine . . . to the precision-made engine that makes aviation a vital factor in today's warfare. It's a difference of many hundreds of horsepower, of innumerable mechanical inventions and refinements, of new processes in the applied art of aeronautics —all giving to the modern aircraft power plant a stature undreamed of by the pioneering Wright brothers. As in many other industrial directions, America is now foremost in the production of aircraft engines, both as to quality and quantity. This attainment has been due primarily to the tremendous strides that have been made in machine tools that could adhere to extremely close manufacturing tolerances, and could produce repeatedly, for interchangeable use, and at great and sustained speed, the thousands of precision parts that make up the aircraft engines of today. *In the construction of every airplane engine produced in this country—parts are used that are machined on one or another of the various precision machine tools made by Ex-Cell-O.*

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To left: **Ex-Cell-O Precision Thread Grinder No. 33 (one of nine Ex-Cell-O styles) widely used in aircraft industry for production of accurately threaded parts. . . . EX-CELL-O precision thread grinders grind fine threads directly from heat-treated blanks and finish grind coarser threads after heat treatment.**

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AS THE EDITOR VIEWS THE NEWS

STEEL
May 17, 1943

4 YRS., 3 MOS., 14 DAYS: Good news from Africa, the presence of Winston Churchill and other high Allied officials in Washington and signs of increasing unrest in occupied Europe combine to stir hope in many minds that the end of the war is definitely nearer than it seemed to be a few short months ago.

It is unwise to be too optimistic on the basis of recent favorable developments. We cannot afford to lessen our effort. On the contrary, we should buckle down to more and harder work and to greater sacrifices. Every additional punch we can deliver now will tend to shorten the war.

Can we shorten it to the length of World War I?

Serbia declared war on July 28, 1914. This act, which touched off the hostilities in the first World war, antedated the armistice of Nov. 11, 1918 by four years, three months and 14 days.

The present war broke out on Sept. 1, 1939. Four years, three months and 14 days from that date falls on Dec. 15, 1943.

Dare we hope that more intensive effort all along the line could bring the European phase of this war to a close by that time? It is a powerful incentive.

• • •

TOMORROW'S BUSINESS: Industrial news is heavily tinged with speculation as to the volume and character of business in the postwar period. No one can visit the West Coast industrial centers without encountering discussions as to how the tremendous plant capacity now engaged in war work will be employed in peacetime.

Most observers feel that a greater portion of the nation's consumer goods may be manufactured west of the Rockies after the war. Some contend that automobiles (p. 87) will be among California's postwar products. Others believe the Pacific coast's opportunities will lie more in the field of light consumers' goods, such as refrigerators, stoves, radios, washing machines, etc.

Pertinent to the West Coast problem—or, in fact, to the postwar prospect in most American industrial areas—are factors discussed at a meeting of executives in New York (p. 96), sponsored by the National Industrial Advertisers Association. According to speakers at this meeting, this nation after the war will have a vast accumulation of purchasing power in the hands of buyers, great supplies of materials of high quality, and a tremendous force of workers familiar with the technic of mass production.

With these and many other resources at its disposal, how can industry co-ordinate its policies and activities to meet the challenge of postwar adjustments?

The answer is still in the making. It will take careful planning and the co-ordination of the efforts of many groups and interests to insure success. Consideration of these problems now—before it is too late—may be the means of avoiding an "industrial Pearl Harbor."

• • •

ORE, COAL AND SCRAP: Everybody knows how the weather interferes with activities in the war zones. The effects of fog, mud, snow, rain, ice, sand and wind figure in the news of battle frequently.

Not as well known is the extent to which untimely behavior of the elements affects industrial production on the home front. Since Pearl Harbor, American industry has suffered more than its normal share of trouble from floods, excessive snow, ice, tornadoes, etc.

A case in point is the present situation on the Great Lakes. The ice in the upper lake bottlenecks went out much later than usual. As a result, shipments of iron ore to lower lake points will not hit a capacity pace until late in May. Unless the weather permits shipments to a later date than usual in the fall (p. 92), there is a possibility that the ore brought down this season will not exceed the 1942 tonnage.

This unfavorable condition tends to jeopardize the delicate balance between fuel, iron ore and scrap. Thanks to fine co-operation by many groups, the supply of scrap has been built up to a fairly comfortable tonnage. But if a shortage of iron ore or a prolonged coal strike should cut down the output of pig iron appreciably, steelmakers would be forced to cut into their precious stocks of scrap to make up the deficiency.

We still need all the scrap we can get and we need all of the iron ore that can be transported. We

(OVER)

also need a continuous output of fuel and as much good luck as to weather as Dame Nature will grant us.

• • •

RELIEF FOR HEADACHE: With few exceptions, manufacturers who are working on war contracts for government agencies are deeply concerned over the renegotiation of contracts. A half dozen or more industrialists cannot be together 10 minutes without somebody bringing up the subject of renegotiation.

It is likely that much of the anxiety arises from a lack of understanding of the objectives of renegotiation. Another source of concern is that in some instances the renegotiators have evidenced little knowledge of industrial operations and the contractors have lost confidence in them.

Every industrialist subject to renegotiation will do well to read the report of a meeting of renegotiators (p. 93), held recently in Pittsburgh to promote a more effective co-ordination of renegotiating methods. At this meeting it developed that of $2,500,000,000 "recovered for the government by contract renegotiations," only 25 to 30 per cent represents refunds resulting from renegotiation of profits, whereas 70 to 75 per cent represents savings resulting from price reductions.

We believe that manufacturers may derive some encouragement from the fact that the renegotiating agencies avowedly prefer renegotiation of price to renegotiation of profits. If the deed matches the intent, and if the renegotiators can get the prices adjusted properly before a profit is entered in the books, the headaches of contractors will be relieved considerably.

• • •

NOT FULTON'S FOLLY: One of the most fascinating developments of this war is the contest in which the shipyards of the United Nations are pitted against the destructive force of the enemies' submarines. Shipbuilders, gradually gaining in a nip-and-tuck race, were heartened considerably by the Allied victory in Tunisia. This opens the Mediterranean and shortens the route to the Near East, which is equivalent to an increase of more than two million tons of merchant ships.

But war on the sea is not confined to cargo carriers and the traditional fighting ships. Recently more emphasis has been shifted to auxiliary vessels —many of them of moderate size. In this latter category is the ocean-going tank carrier. This is a flat-bottomed vessel of shallow draft, designed to carry a load of tanks right up to a beach, where they can be driven ashore under their own power.

Most of the tank carriers are being built in shipyards on inland waters. A typical yard is at Evansville, Ind., on the Ohio river. The yard, operated by the prime contractor (p. 102), is essentially an assembly plant. About 15 subcontractors, situated within a 200-mile radius of the yard, prefabricate 81 per cent of the hull. Adaptation of Eli Whitney's principle of interchangeable manufacture, coupled with modern refinements in design and in welding, makes possible this system of prefabrication and assembly at widely separated points.

An interesting sidelight on how old ideas are put to work in the present war is provided by the discovery that a novel method of launching a vessel sideways, developed and patented by Robert Fulton more than a century ago, solved a difficult launching problem at the Evansville yard.

• • •

THE LINE IS WEAK: Every day brings out new evidence that the government is losing ground in its battle against inflation. It is managing to slow the pace of rising prices and wages, but it is not "holding the line," nor is it even offering the degree of resistance which the public would welcome.

Much of the trouble goes back to the social experiments of the thirties and the coddling of pressure blocs during the "defense" era. The administration made commitments in those periods which cannot be shaken off easily now. Consequently, the government cannot prosecute the war independently; it is encumbered by embarrassing entanglements of the depression and defense "emergencies." These millstones are apparent in the administration's position on labor relations, wages and hours, prices and taxes.

The present failure to hold the line is bound to cause violent repercussions. Out of the chaos is likely to emerge a reshuffling of agencies, with hope of some belated improvement in the handling of the nation's internal problems. A thorough house cleaning is overdue right now.

E. L. Shaner

EDITOR-IN-CHIEF

FOR QUICK ACTION ON STEEL

"WE'RE having better luck on steel, now," said a manufacturer the other day. "There *were* times when we had to 'phone and 'phone, but now we are going to the warehouse with the most complete stocks, with best facilities for handling and delivery. We are saving the time of shopping around—and saving man-hours in our plant—by calling Ryerson first."

Sound reasoning, isn't it, when you want something, to go where you're most apt to get it. Whether it's fast service, a steady, reliable source, a cutting or fabricating operation that will facilitate your production, or just information and assistance, you're most apt to get what you want by calling Ryerson first!

Ryerson has maintained its leadership in the steel business by making good every promise, by knowing the kind of service customers want and giving it to them, and above all else, by having *in stock* most of the time the kinds, shapes and sizes of steel they want, ready for immediate delivery.

Stocks are reasonably complete, considering the war demand placed upon them. But, whatever kind of steel you want, within the WPB plan; whatever service you would like to have, *call Ryerson first!* You'll get prompt, intelligent cooperation—at Ryerson!

JOSEPH T. RYERSON & SON, *Inc.*, Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

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CLEVELAND, OHIO

U. S. Tooled Up; Cuts Back Plant, Machinery Programs

Accent to be placed on direct munitions production . . . Some construction to be halted . . . Revamping of program to have far-reaching effect reflecting change in equipment situation

IN A MOVE which will have far-reaching effects upon war industry, the WPB last week took action designed to throw maximum strength of facilities, plant and equipment into the production of war goods.

The move calls for these steps: 1—Re-examination of all previously approved projects for construction of new manufacturing plants and machinery to determine whether the need for them cannot be eliminated by greater use of present structures, plant capacities, machine tools and equipment.

2—No purchase of new machine tools, machinery or equipment or erection of buildings will be authorized until it has been conclusively proved the work cannot be done by existing facilities.

As result of this action some new facilities now being built will be stopped. Some which are now in place producing direct or indirect military goods will be curtailed as shifts are made from one type of production to another.

The action follows months of study of the facilities situation in which a number of cancellations of construction projects have previously been announced and represents a united move by the armed forces and WPB.

Plant Facilities Adequate

For the first time in its history, the nation now has a physical plant adequate to make the maximum use of its resources in men, skill and materials.

Details of the action now being taken were examined at a number of meetings of the board of WPB.

To make the program fully effective, machinery was set up to insure proper screening, scheduling and programming of all new facilities. This will be done through a new facilities review committee in WPB, on which all claimant agencies will be represented, which will limit the facilities program to just what is needed and make certain that it is shaped so as to keep pace with the ever-changing requirements of modern warfare. This committee will replace the Facility Clearance Board.

All orders for new tools and equipment, including those now approved only by the Army-Navy Munitions Board, must after June 1, 1943, be submitted to WPB for approval, the only exception being foreign construction and certain "command" projects necessary in theaters of war.

Each procuring service is to prepare, by June 1, a list of the tool orders of its contractors, classified by programs, and indicating whether expansion of capacity is or is not required for each program. Where expansion is not necessary, tool orders will be cancelled.

WPB Centralizing Inventories

WPB will move immediately to centralize inventories and catalogs of idle or available machine tools, against which all proposals for new facilities will be checked to determine whether the new facilities are in fact essential. To keep these catalogs current, all agencies will file with WPB by July 1 a record of available manufacturing capacity not needed for their program requirements, and will report regularly all additions to the list.

The entire program can be summed up by saying that it calls for a substantial increase in the proportion of the nation's total production which directly increases the striking power of the allied armed forces. This will come in two ways—

(1) Through use for direct war production of manufacturing capacity and materials which thus far have been used to make machinery and equipment. During the first three years of the war program America has devoted almost as much effort to construction and facilities as it did to the production of arms and munitions of war.

(2) Through the reconversion to other types of war production of plant capacity which is being or will be released due to changes in the military situation. As the military situation changes, the services find that they need more of one kind of weapon and less of another kind than had originally been expected. Facilities no longer needed to make weapons which are required in smaller volume are converted to the manufacture of weapons for which the need has increased. Many such conversions have already been made; the number will increase greatly as the new facilities program becomes operative.

In addition, considerable additional capacity is available for conversion to military production from civilian or indirect military use.

The action reflects a marked change in the nation's machine tool situation.

Since the beginning of 1939, America has approximately doubled its stock of machine tools. Machine tools were the big bottle-neck at the start of the program; consequently, a large part of the war effort to date has consisted of increasing the output of tools—and, along with it, of building new factories in which the tools might be used. The size of the effort is best shown by a few figures—

As of Feb. 28, 1943, the total value of all federally financed new industrial facilities projects stood at $15,100,000,000.

Of this, projects costing nearly $4,000,000,000 had been completed.

Existing schedules called for completion of an additional $7,000,000,000 by the end of June and for the completion of all active projects (with the exception of projects estimated to cost less than a billion) by the end of 1943.

All of this means that the nation has increased its manufacturing capacity enormously. It has increased it so enormously that maintenance of facility expansion at the 1942 level—which at times took nearly three million men from the country's labor force—is no longer called for. Likewise, when the production of all-important items such as ships and guns is governed by the supply of steel, it is no longer wise to divert from 20 to 24 per cent of the nation's steel output to the construction field.

Undertake New Conversion Job

There is now being undertaken, within the war program, a conversion job not unlike the conversion that accompanied industry's original change-over from civilian to military production.

The first conversion job reflected the shift from a peace economy to a war economy — this one reflects the shifts which inevitably develop in a war economy as the face of the war itself changes. No type of economic planning could have averted the effect of these changes in the war.—But because the fact that there would be changes was foreseen, so that the nation's industry was brought into the war economy with its flexibility unimpaired, it is now possible to make the shifts which the changes necessitate without delaying or cutting down the total war program.

To attain the goal of limiting all facilities projects to those which are vitally needed, the programming of needed facilities will be approached in much the same way as the programming of materials is now handled.

Steelmakers "Approve" 48 Hour Week; Hope for Modifications

MODIFICATIONS to the 48-hour-week ordered for the steel industry are expected to follow last Thursday's conference between the WPB Steel Industry Advisory Committee and War Manpower Commission officials.

The industry, through the advisory committee, advised that it "approved" the 48-hour week "where it is practicable and will serve either to increase the production of steel or to conserve manpower."

Privately, members of the industry oppose the mandatory longer work-week "because of many practical operating problems" and because it would increase operating costs from $100,000,000 to $120,000,000 a year without increasing steel production.

They point out the industry now is operating at practical capacity. Primary mills generally are on a 48-hour or longer week. Finishing mills often are forced to work fewer hours because of inability to obtain raw steel. Shifting demands for the various types of steel products indicate the advisability of keeping forces of these mills intact.

Industry spokesmen also wonder how long it will be possible to absorb increased costs without raising steel prices —which now are about the same as in 1939.

High Labor Costs Cut Earnings

Net income of 19 major producers for the first quarters of the years of 1941 (when this country entered the war), 1942 and 1943 decreased from $83,811,988 to $56,466,240 to $42,815,711. On an annual basis, the industry's earnings decreased from $327,328,000 in 1941 to $221,230,000 in 1942. Imposition of higher overtime costs apparently will further reduce this drastically in 1943.

Viewing this financial experience, producers have only the doubtful solace that they can never be accused of being "war profiteers." On the other hand, they are faced with the very real problem of rehabilitating their plants after the war, and repairing the damage caused by a long period of capacity operations.

Youngstown, O., steel executives expressed the belief that the country is faced with rising steel prices and serious inflation unless the 48-hour week is modified. They estimate the mandatory longer work week for all departments will cost Youngstown district steel mills from $8,000,000 to $10,000,000 annually in increased wages without obtaining any more steel production or easing the labor supply situation.

Many finishing mills in the Youngstown district are working only three or four days a week because of lack of steel.

At Pittsburgh, steel executives said the adoption of the 48-hour week would result in the down-grading of some workers and the layoff of others. They declared the mandatory longer week could have no effect on steel production inasmuch as facilities now are and have been pushed to capacity. Only result will be to increase costs, raise the workers' weekly wages, and release some employes.

Birmingham, Ala., operators opposed the 48-hour week plan on the basis that it could not increase output since the industry already is producing at 100 per cent of capacity and has been for months. The industry has made effective use of all manpower and equipment available.

Alabama executives belived that if the longer week is enforced that workers will use their own discretion in putting in overtime and expect that absenteeism may increase, thus nullifying any benefits that might be expected from the increase in hours of work scheduled.

Increased costs in the southern district will amount to about $750,000 monthly, and the "probability is that selling prices must be increased."

On top of the troubles to be caused by the 48-hour week, if enforced, was the recurrent possibility of a coal strike when the second truce between the United Mine Workers and the government expires May 18.

Longer work-week means more money in the weekly pay envelopes of steelworkers—and additional costs to an industry already experiencing lean profits. NEA photo

Present, Past and Pending

■ MORE TUNGSTEN FOR HIGH-SPEED STEEL

WASHINGTON—War Production Board has increased the amount of tungsten which may be used in production of high-speed steel, effecting substantial savings in use of molybdenum. Amendment to order M-21-h authorizes production and purchase of tungsten-type high-speed steels up to 35 per cent of total high-speed steel output.

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■ WORK RUSHED ON NEW SOO LOCK

DULUTH—Work on the new deep-water lock at Sault Ste. Marie is expected to be completed by July 1, permitting first full loading of five new ore freighters put into service last year by the Pittsburgh Steamship Co.

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■ PACKARD MORE THAN DOUBLES VOLUME

DETROIT—First quarter volume of Packard Motor Car Co. was nearly two and one half times that of like 1942 period. Output expansion of Rolls-Royce engines for aircraft and marine engines for PT boats boosted volume to about $86,000,000.

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■ NELSON ASKS SHORT HOLIDAY WEEKENDS

WASHINGTON—WPB Chairman Nelson has asked that regular fulltime working schedules be maintained in war plants over the Memorial Day and Independence Day weekends. Both days fall on Sunday.

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■ AKRON UNIONISTS THREATEN LABOR HOLIDAY

AKRON, O.—Akron Industrial Council-CIO threatens a labor holiday June 2 unless War Labor Board approves a panel recommendation for wage increases for rubber workers. Unionists say stoppage would not be a strike as a clause in contracts permits them to select one day a year for a holiday.

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■ FIRST IRON EXPECTED FROM STACK IN JUNE

CHICAGO—First cast from the reassembled blast furnace which was moved from Joliet, Ill., to a plant in the Far West is expected about mid-June. One battery of the 225 new beehive coke ovens at the plant is being dried and soon will be charged.

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■ WORK PROGRESSING ON GENEVA STEEL PLANT

PROVO, UTAH—Expectations are first plates will be rolled at the Geneva steel plant near here in October. Construction is progressing despite difficult supply situation.

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■ TRANSFERS STEEL INVENTORY CONTROL

WASHINGTON—WPB has transferred control over inventories of steel held by manufacturers of passenger cars and parts from order L-2-i to Priorities Regulation No. 13. Order L-2-i prohibited manufacturers from selling any part of their steel inventories, except standard steel to holders of A-3 rating and alloy steel to holders of A-1-k rating.

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■ AMERICAN PLANE OUTPUT TOPS WORLD TOTAL

WASHINGTON—President Roosevelt says American aircraft production exceeds combined output of the rest of the world. U. S. production in March totaled 6200 planes, including 500 heavy bombers. Total for 1943 is expected to reach 911,000,000 pounds and estimates for 1944 range as high as 1,417,000,000.

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■ AFRICAN SHIPMENTS AVERT MANGANESE SHORTAGE

NEW YORK—Serious manganese shortage has been averted by shipments from West Africa, reports W. L. Badger, manager, consulting engineer division, Dow Chemical Co., Midland, Mich.

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■ HAND TOOL PRICE RULING MADE BY OPA

WASHINGTON—Maximum prices of certain hand tools and chain when sold by manufacturers to the United States and Allied governments in orders of $100 or more must not be higher than the ceiling established for sales to distributors, Office of Price Administration has ruled.

Rout in Tunisia Severe Blow to Axis Economy

CATASTROPHE for the Axis in Tunisia spells more than the end of a victorious miliary campaign for United Nations.

Collapse of the German and Italian armies in North Africa not only gives the United Nations a "jumping off" place for an all-out offensive against the European continent, but deals the Axis economy a severe blow, cutting off Germany and Italy from critically needed minerals and food products.

The Tunisian victory also opens the vital supply line in the Mediterranean to United Nations' shipping though Axis planes and submarines remain as a threat and military experts declare it will be necessary to maintain an umbrella of planes, based on the Tunisian and Libyan coasts, to protect supply ships as they shuttle through the strategic and dangerous Mediterranean Sea.

Tunisia alone is an economic prize of importance, ranking third in the production of phosphates behind the United States and Russia. French North Africa was Germany's only remaining source of phosphate rock, principal mines being located near the Algerian border around Gafsa and in the Le Kef district. Tunisia's three other principal minerals are iron ore, lead ore, and zinc ore found scattered throughout the country. Chief producing areas are in west central Tunisia across the border from the Tebessa region of Algeria and in the extreme northwest near the port of Tabarca.

Lead ore mined in Tunisia played a small but important role in the German industrial machine since its metallic content ranged between 60 and 70 per cent. A smelter at Megrine, near Tunis, treats both Tunisian and some Algerian ore. Mining of mercury ore, manganese, copper ore and salt were of less significance. There are no coal and petroleum resources in that country. Industries are of minor importance except for the lead smelting and food processing plants.

Germany no longer has access to the iron ore supplies found in Algeria and Morocco.

Copper is found in the Belgian Congo, lead and zinc in Algeria, tin in Nigeria, and manganese in Egypt, which temporarily fell into Axis hands. From French Morocco in 1942, the Axis obtained phosphates and small amounts of molybdenum, cobalt and manganese.

Tunisia not only was a vital source of minerals to the Axis but an important source of agricultural products.

No Immediate Extension of CMP Pends, Conference Told

WAR Production Board has not decided whether the Controlled Materials Plan will be extended to materials other than steel, copper and aluminum but the decision probably will be made in the next six months.

This was revealed last week in Cincinnati at the triple war conference of the American Machinery & Supply Association, the National Supply & Machinery Distributors' Association and the Southern Supply & Machinery Distributors' Association by Henry P. Nelson, assistant director, CMP Division, WPB.

The War Production Board hopes to be able to adjust the war program on the basis of the three materials and this might involve doing away with the allotment plan for materials to simplify procedure, he said. The Board is pleased so far with the operation of CMP and "it's here to stay," Mr. Nelson declared.

Industry can expect further revisions in the CMP plan as well as the issuance of additional regulations. CMP Regulation No. 6 covering construction and facilities is due in about six weeks. The regulation will combine all present regulations and is designed to simplify procedures.

CMP Regulation No. 7 provides for one type of CMP certification and eliminates the necessity for using several such certifications on one order. It will be extended to all materials under L, M and P orders and, on issuance, will "largely solve the purchasing agent's problem," Mr. Nelson said.

Regulation No. 8, also pending, outlines the method to be followed by controlled material producers in securing the materials they require. Mr. Nelson said Regulation No. 4 covering the warehouse program already is expediting the flow of material to them and a further increase may be expected as time goes on.

Huge Increase in Cutting Tools

Franz T. Stone, chief, Industrial Specialties Branch, Tools Division, WPB, pointed to the sharp expansion in cutting tool production. Amounting to $40,000,000, in 1940, production this year is running at the annual rate of $420,000,000.

That contract renegotiation is confusing and is being misapplied was evidenced in a forum session on this subject and later in an address by Senator Harry S. Truman.

As an outstanding example of misapplication, a maker of files declared in his case renegotiation was applied to his entire production and not simply to direct war business. A manufacturer of bolts and nuts said renegotiation was applied to 40 per cent of his 1942 production. The same basis for renegotiation is being extended to 1943 production running better than 98 per cent for war purposes which means that his net profit is likely to drop to less than 1.5 per cent on sales.

In his address, Senator Truman promised further investigation of the renegotiation of war contracts. He said the principles and results of renegotiation have been shrouded with entirely too much secrecy. Furthermore, the agencies administering the renegotiation law have set up entirely different types of organization, sometimes applying different principles in determining allowable costs, allocation of business and amounts of profits deemed excessive. In some renegotiations good performance only has been considered while in others straight percentage of profit only was considered.

"Reward for Quality, Economy"

The Senator's investigating committee has recommended immediate adoption and publication of uniform price adjustment policies, most important of which should be to measure the reward by the quality and economy of the production job done and thus offer an additional incentive to high-quality, low-cost production. Further, it was recommended that one governmental determination of allowable and non-allowable costs should be made binding on contractors and on government for both income tax purposes and renegotiation.

He said he thought it will be possible in the future to exempt increasing numbers of products from the renegotiation procedure as more experience is gained with war production contracting. The administrators already have the authority to make such exemptions under the law.

"We have had the co-operation of contractors as well as of the Price Adjustment Board in studying the effects of renegotiation and we expect to continue our investigation so that any future mistakes or abuses may be corrected as soon as possible after they occur," he said.

The manpower problem is constantly growing more acute and industry will find it necessary to revise its thinking about the type of workers it will employ,

A. A. MURFEY

F. J. TONE JR.

ROBERT D. BLACK

C. F. CONNER

in the opinion of Edward L. Keenan, deputy regional director, War Manpower Commission, Cincinnati.

Unemployment has dropped from about 8,000,000 to 1,000,000. Not much manpower is left in this pool. At the same time, he said, 4,000,000 more men are required for the armed services along with 2,000,000 for industry.

The 18-38 age group includes about 22,000,000 men, of which 8,000,000 do not meet physical requirements leaving a balance of 14,000,000. Of the latter total, 7,000,000 already are in service and 4,000,000 are due to go this year. Out of the 3,000,000 remaining 1,500,000 are deferrable in one group as farm workers.

"Industry no longer can expect to hire men from the 18-38 age group," he said, "and it must call on women and miscellaneous groups. Three out of ten workers in industry are likely to be women by the end of this year. In fact, more than half the additional workers required must be women, he said.

Industry must hire negroes of which 500,000 are available in the South. Also there are probably 1,000,000 in the handicapped class, plus wounded returning from the battlefronts.

"It will be necessary to constantly lower standards for workers," he said.

Industry can use more women for heavy work, it has been found by the Worthington Pump & Machinery Corp., Harrison, N. J. W. W. Kemphert of this company said women worked well in its foundry sorting rods for molders, bending rods, operating cranes and even handling large cores. Women are being used in a number of departments as stock room attendants, production expediters, inspectors, driving electric mules, machine tool operators, etc.

Postwar Problems Discussed

Postwar problems occupied an important place in the program, speakers including Carlton K. Matson, Committee for Economic Development, Washington, and Dr. Ernest L. Stockton, principal research office, Co-ordinator of Inter-American Affairs.

Mr. Matson pointed out that the CED is entirely independent from the government although it works closely with it.

The CED now is in the process of setting up a large national organization which will penetrate every community. Chairmen have been appointed for 11 of the 12 Federal Reserve districts and, in addition, district chairman will be set up for about every 1,000,000 in population. Seventy chairmen have been named.

Within the next three months, 1000 community chairmen will be appointed who will be responsible to the district chairmen. Of this total 155 already have been selected. Each local community will have a CED committee.

All types of information possible will be made available to help industry prepare for the postwar period. This will include plans already worked out by some companies, market information and the like.

Small Companies First Concern

The CED is largely concerned with the smaller companies since it figures the larger ones are in a better position to work out their own postwar plans without outside assistance. The sort of work the CED wishes to stimulate finds an excellent example in Toledo where the Toledo Scale Co. made an investigation and found 20 laboratories. It may be possible to work out a "lend-lease" arrangement whereby these facilities can be made available to smaller companies in conducting postwar research.

At the closing session, the following officers were elected for the coming year:

American Association: A. A. Murfey, Cleveland File Co., Cleveland, president; F. J. Tone Jr., The Carborundum Co., Niagara Falls, N. Y., first vice president; Robert D. Black, Black & Decker Mfg. Co., Towson, Md., second vice president; C. F. Conner, B. F. Goodrich Co., Akron, O., treasurer.

National Association: A. J. Glesener, The A. J. Glesener Co., San Francisco, president; F. Marsena Butts, Butts & Ordway Co., Cambridge, Mass., vice president, Areas 1 and 2; Charles E. Allinger, The Charles A. Strelinger Co., Detroit, vice president Areas 3 and 4; E. H. McLaughlin, Union Hardware & Metal Co., Los Angeles, vice president Areas 5 and 6.

Southern Association: Alvin Smith, Smith-Courtney Co., Richmond, Va., president; P. Pidgeon, Pidgeon-Thomas Iron Co., Memphis, Tenn., first vice president; Harry P. Leu, Harry P. Leu Inc., Orlando, Fla., second vice president; E. L. Pugh, Atlanta, Ga., secretary-treasurer.

AUSTRALIAN SAYS U. S. WAR OUTPUT "MAGNIFICENT"

"Magnificent results" was the summation of the war production picture by Air Vice-Marshall A. T. Cole of the R.A.A.F. (right) as he inspected output of Rolls-Royce aircraft engines at the Packard plant in Detroit with Packard Vice President W. M. Packer (left). Cole is a member of an air mission from "Down Under"

Steel Expansion Runs Six To Eight Months Behind Schedule

STEEL expansion program is running six to eight months behind schedule. Claimant agencies will be short five million tons in their third-quarter requirements. The alloy situation is so bad if the electric furnace program were on time, there would not be enough alloys to produce steel up to capacity. "Easy" steel this year is a myth.

This, baldly, is the situation in steel today as outlined by Hiland G. Batcheller, head of the Iron and Steel Branch, War Production Board, speaking to the Association of Iron and Steel Engineers in Pittsburgh last week.

Mr. Batcheller showed a timetable of the steel producing and raw materials program, showing how far it has progressed and when it will be finished. According to Mr. Batcheller, on Jan. 31, 16 per cent of the new coke oven capacity had been installed. On Feb. 28, 21 per cent was in; on March 30, 26 per cent; and at end of May, 30 per cent.

Program is scheduled for completion at the end of next December. Between now and the end of the year more than five million tons of by-product coke capacity will be installed. On May 1 the by-product coke oven capacity expansion was running more than a million net tons behind schedule.

The sintering plant expansion program was 18 per cent complete on Jan. 31. There was no change in this program until April 30, when the program was 28 per cent completed. On May 30 the figure will be 30 per cent, but the program as now outlined will reach its final stage by the end of November, four months late, with six and a half million tons of sintering capacity remaining to be completed between now and then.

The blast furnace program in January was 31 per cent finished. By the end of February it had reached 37 per cent; by March 31, 40 per cent; and on May 30 it will touch 43 per cent, still less than half complete on a schedule which will not see the program completed until the end of November.

The open-hearth expansion program has been drastically slowed down. At the end of January, 1943, it was 23 per cent complete. February figures show 26 per cent completion, while March and April showed 28 per cent. The gain during May will be only 1 per cent additional. Unless something unusual happens, the open-hearth program will be completed in February, 1944, about six months behind schedule.

Electric furnace capacity expansion was 28 per cent complete in January, made no gain in February, March or April, will rise to 44 per cent in May, and will reach full completion in October, about four months late.

The delay in the increase in the open-hearth program alone has cost about 1,600,000 tons of steel. This tonnage which should have been produced in 1943 will not be available until 1944. The loss in electric furnace production if the schedule is not further delayed will amount to approximately 502,000 net tons of alloy steel.

Under the Controlled Materials Plan requirements scheduled by the claimant agencies for the third quarter total 23,000,000 tons. Production during the third quarter will be approximately 18,000,000 tons, an apparent shortage of 5,000,000 tons of steel. Much concentrated study and rechecking by the staff has boiled out 2,000,000 tons of duplicate material, so that the actual shortage during the third quarter will be 3,000,000 tons on only the most vital war contracts.

The picture in alloy steels is not good. March production totaled 1,256,000 tons, against a pre-war average of only 300,000 tons per month. Ultimate monthly capacity, which will be reached when the present electric furnace program is completed, will be 1,500,000 tons per month.

Steel Ingot Output Sets April Record

Production of 7,374,154 net tons of steel ingots and castings in April set a new peak for a 30-day month, the American Iron and Steel Institute reports.

The April tonnage was short of the March record of 7,670,187 tons, but substantially exceeded the April, 1942, output of 7,121,291 tons. The previous peak production in a 30-day month was made in November, 1942, with 7,179,812 tons.

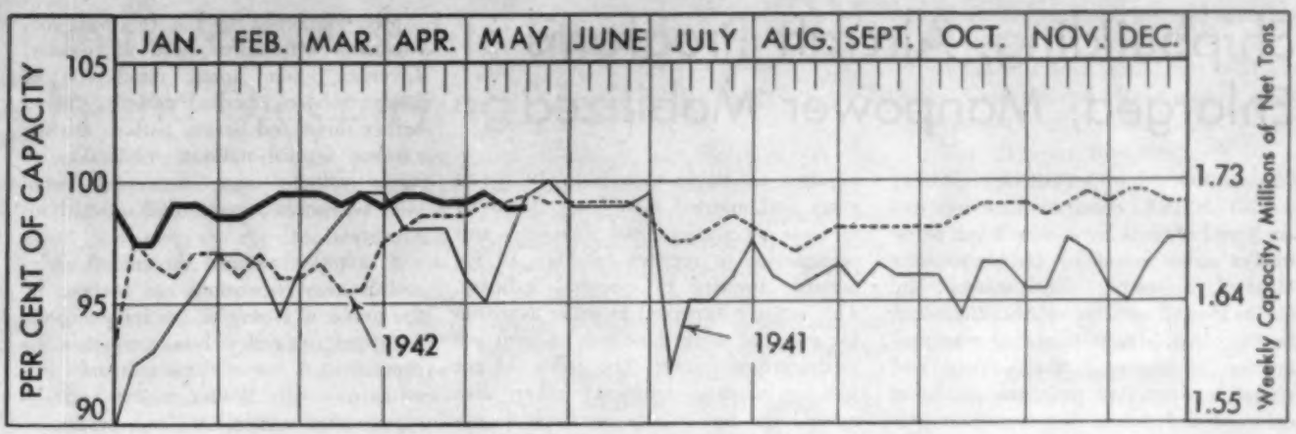
During April the industry operated at an average of 99.3 per cent of rated capacity, against an average of 100 per cent in March and 97.7 per cent of capacity existing during April, last year.

STEEL INGOT STATISTICS

	Estimated Production—All Companies								Calculated weekly	Number
	—Open Hearth—		—Bessemer—		—Electric—		—Total—		produc-	of
	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	tion, all companies Net tons	weeks in mo.
Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production										
1943										
Jan.	6,576,589	97.8	478,058	85.9	369,395	95.4	7,424,042	96.8	1,675,856	4.43
Feb.	6,033,674	99.3	447,843	89.1	344,532	98.6	6,826,049	98.5	1,706,512	4.00
March	6,785,295	100.9	503,673	90.5	381,219	98.5	7,670,187	100.0	1,731,419	4.43
April	6,509,812	99.9	481,810	89.4	382,532	102.1	7,374,154	99.3	1,718,917	4.29
1st qtr	19,395,558	99.3	1,429,574	88.4	1,095,146	97.5	21,920,278	98.4	1,704,532	12.86
Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production										
1942										
Jan.	6,322,215	95.3	490,874	86.0	299,017	94.2	7,112,106	94.5	1,605,442	4.43
Feb.	5,785,918	96.6	453,549	88.0	273,068	95.2	6,512,535	95.9	1,628,134	4.00
March	6,572,930	99.0	493,191	86.4	325,990	102.7	7,392,111	98.2	1,668,648	4.43
1st qtr	18,681,063	97.0	1,437,614	86.7	898,075	97.4	21,016,752	96.2	1,634,273	12.86
April	6,345,133	98.7	454,834	82.2	321,324	104.5	7,121,291	97.7	1,659,975	4.29
May	6,595,440	99.4	453,938	79.5	333,200	104.9	7,382,578	98.1	1,666,496	4.43
June	6,239,674	97.1	452,528	81.8	323,100	105.1	7,015,302	96.3	1,635,269	4.29
2nd qtr	19,180,247	98.4	1,361,300	81.2	977,624	104.8	21,519,171	97.4	1,654,049	13.01
1st hlf	37,861,310	97.7	2,798,914	83.9	1,875,699	101.1	42,535,923	96.8	1,644,218	25.87
July	6,345,315	95.7	453,686	79.6	345,957	96.6	7,144,958	94.5	1,616,506	4.42
Aug.	6,414,637	96.5	467,293	81.8	345,725	96.3	7,227,655	95.4	1,631,525	4.43
Sept.	6,286,855	97.9	437,961	79.4	332,703	95.9	7,057,519	96.4	1,648,953	4.28
3rd qtr	19,046,807	96.7	1,358,940	80.3	1,024,385	96.3	21,430,132	95.4	1,632,150	13.13
9 mos.	56,908,117	97.3	4,157,854	82.7	2,900,084	99.4	63,966,055	96.3	1,640,155	39.00
Oct.	6,750,829	101.5	461,897	80.9	366,788	102.2	7,579,514	100.0	1,710,951	4.43
Nov.	6,371,750	99.0	458,469	82.9	349,593	100.5	7,179,812	97.8	1,673,616	4.29
Dec.	6,471,261	97.6	475,204	83.4	358,075	100.0	7,304,540	96.6	1,652,611	4.42
4th qtr	19,593,840	99.4	1,395,570	82.4	1,074,456	100.9	22,063,866	98.2	1,679,137	13.14
2nd hlf	38,640,647	98.0	2,754,510	81.3	2,098,841	98.6	43,493,998	96.8	1,655,653	26.27
Total	76,501,957	97.9	5,553,424	82.6	3,974,540	99.8	86,029,921	96.8	1,649,979	52.14

The percentages of capacity operated in the first 6 months of 1942 are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942, as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons Bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, Bessemer 6,721,400 net tons, Electric 4,225,890 net tons.

The percentages of capacity operated in 1943 are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,360 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943 as follows: Open hearth 79,180,880 net tons, Bessemer 6,553,000 net tons, electric 4,554,980 net tons.



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,408	6,811	7,670	7,374	....	....	....	....	....	....	....	....
1942	7,124	6,521	7,392	7,122	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	5,314	....	....	....	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,031	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,767	5,014

Operations Steady At 98½ Per Cent

Production of open-hearth, bessemer and electric furnace ingots last week remained stationary at 98½ per cent of capacity. Four districts made small gains, four declined and four were unchanged.

A year ago and two years ago the rate was 99½ per cent, both based on capacities as of those dates.

Furnace repairs alone held the rate from rising, Chicago losing 2 points and Pittsburgh 1 point. Gains in other districts served to balance these declines.

A new blast furnace and one that has been relined are about to be blown in at Buffalo.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended May 15	Change	Same week 1942	Same week 1941
Pittsburgh	99	—1	96	99
Chicago	97	—2	105	102.5
Eastern Pa.	96	+2	95	95
Youngstown	95	None	94	95
Wheeling	87.5	—5	81.5	88
Cleveland	94	+6	94.5	95
Buffalo	90.5	None	90.5	93
Birmingham	100	None	95	95
New England	95	+5	100	100
Cincinnati	92	—2	84.5	92.5
St. Louis	90	+3	93.5	98
Detroit	96	None	96	88
Average	98.5	None	*99.5	*99.5

*Computed on bases of steelmaking capacity as of those dates.

Gas House Coke Production Totals 892,552 Tons in 1942

Gas house coke production in the United States in 1942 totaled 892,552 net tons, 509,782 tons of which was produced in vertical retorts, 363,358 tons in horizontal retorts and 19,412 tons in small horizontal ovens, the Bureau of Mines reports.

Producers sold 449,220 tons for domestic heating, 21,398 tons for water gas manufacture and 63,264 tons for other industrial uses. The remaining 399,970 tons was consumed by the producers—206,864 tons for bench fuel, 123,851 tons for water gas manufacture, 40,708 tons for boiler fuel and 28,547 tons for manufacture of producer gas. Stocks of coke on hand at producing plants on Jan. 1, 1943, amounted to 131,295 tons. Other by-products produced by the industry were tar, ammonia, and crude light oil. Ninety-six gas plants were operated in 27 states. Of the 2569 retorts which produced coke, 1881 were horizontal and 688 either vertical or inclined. In addition there were 37 small gas ovens in operation at three plants.

Armco Blast Furnaces Set Seventh Pig Iron Record

Setting the seventh pig iron production record in 13 months, blast furnaces of the Hamilton Division of American Rolling Mill Co., Middletown, O., during April exceeded the prior monthly peak by 1078 gross tons. In August, 1942, the sixth consecutive tonnage record was set at a figure regarded as ceiling for the Hamilton equipment, several thousand tons above rated capacity.

Steel Corp.'s April Shipments Decline

Finished steel shipments by United States Steel Corp. subsidiaries in April totaled 1,630,828 net tons, a decrease of 141,569 tons from March shipments of 1,772,397 tons and 128,066 tons under those of April, 1942.

For four months shipments aggregated 6,780,810 tons, compared with 6,895,312 tons in the corresponding period last year. During the first four months of 1941 they totaled 6,638,945 and the like period of 1940 was considerably less with shipments of 3,994,657 net tons.

January 1943 steel shipments totaled 1,685,992 net tons and February's 1,691,592, both being greater than those of April, 1943. Two of the corporation's greatest shipment months of 1942 were May, when 1,834,127 tons were dispatched to consumers, and December when shipments reached a total of 1,849,635 net tons.

(Inter-company shipments not included)

	Net Tons 1943	1942	1941	1940
Jan.	1,685,992	1,738,893	1,682,454	1,145,592
Feb.	1,691,592	1,616,587	1,548,451	1,009,256
Mar.	1,772,397	1,780,938	1,720,366	931,905
Apr.	1,630,828	1,758,894	1,687,674	907,904
May	.....	1,834,127	1,745,295	1,084,057
June	.....	1,774,068	1,668,637	1,209,684
July	.....	1,765,749	1,666,667	1,296,887
Aug.	.....	1,788,650	1,753,665	1,455,604
Sept.	.....	1,703,570	1,664,227	1,392,838
Oct.	.....	1,787,501	1,851,279	1,972,408
Nov.	.....	1,665,545	1,624,186	1,425,352
Dec.	.....	1,849,635	1,846,036	1,544,623
Total	.....	21,064,157	20,458,937	14,976,110
Adjustment	.....	.....	*42,333	†37,639
Total	.....	.....	20,416,604	15,013,749

†Increase. *Decrease.

Shipbuilding, Aircraft Programs Enlarged; Manpower Mobilized

TORONTO, ONT.

EXTENSIVE changes in manpower are foreshadowed by a new labor registration order issued by Labor Minister Mitchell, following announcement by C. D. Howe, minister of Munitions and Supply, that a new phase of war production is starting. Shipbuilding and aircraft construction programs are being enlarged and some other munitions programs probably will be reduced.

New order by the labor department requires all single men from 19 to 40 years and married men from 19 to 25 in some 20 non-essential industries and occupations to register by May 19 for possible transfer to essential industry. This order is expected to make available for essential work thousands of men not in the armed forces. The order did not specify essential industries other than agricultural but it is believed plants engaged in war production will be largely concerned with the order.

Men employed in the following occupations will be required to register: Taverns; liquor stores; retail sale of candy, tobacco, books, stationery, etc.; barber shops and beauty parlors; florists; gasoline service stations; retail sales of motor vehicles and accessories; retail sales of sporting goods and musical instruments.

In addition all men designated under mobilization regulations are covered by the order, if in any of the following occupations, regardless or not whether the occupation is one in those industries listed as covered: Waiter, taxi driver, elevator operator, hotel bellboy, or domestic servant; any occupation in or directly associated with entertainment, including but not restricted to theatres, film agencies, motion picture companies, clubs, bowling alleys or pool rooms; any occupation in or directly associated with dyeing and dry-cleaning, (but not including laundries), baths, guide service and shoe shining.

Must Report to Employment Office

It now becomes obligatory for a man in an age and marital group designated under mobilization regulations and engaged in one of the industries or occupations specified in the minister's order to apply to his nearest employment and selective service office not later than May 19. If there is no higher priority work available for him, he will be given a special permit entitling him to continue temporarily in his old employment. If it appears necessary in the interest of the war effort that he be moved to more essential employment, he will be given a direction to some such employment.

Prime Minister Ilsley has announced cast iron scrap imported into Canada for use by industry is not subject to the 10 per cent ad valorem war exchange tax previously imposed.

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

		No. Companies Reporting	Line	Annual Capacity Net tons	Production for Sale—Net Tons, First Quarter - 1943: Total	Per Cent of capacity	Shipments To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	43	1	xxxxxxx	1,988,448	xxx	577,420
	Heavy structural shapes	10	2	5,412,580	974,647	73.0	xxxxxxx
	Steel piling	3	3	338,000	2,717	3.3	xxxxxxx
	Plates—Sheared and Universal	21	4	9,189,740	3,257,917	143.7	12,858
	Skelp	6	5	xxxxxxx	205,433	xxx	104,877
	Rails—Standard (over 60 lbs.)	4	6	3,629,260	474,858	53.0	xxxxxxx
	Light (60 lbs. and under)	6	7	309,690	34,054	44.6	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	102,000	8,031	31.9	xxxxxxx
	Splice bar and tie plates	13	9	1,120,270	161,434	58.4	xxxxxxx
	Bars—Merchant	40	10	xxxxxxx	1,769,582	xxx	206,904
	Concrete reinforcing—New billet	14	11	xxxxxxx	122,896	xxx	xxxxxxx
	Rerolling	17	12	xxxxxxx	23,303	xxx	xxxxxxx
	Cold finished—Carbon	23	13	xxxxxxx	433,474	xxx	xxxxxxx
	Alloy—Hot rolled	21	14	xxxxxxx	728,501	xxx	111,629
	Cold finished	18	15	xxxxxxx	115,584	xxx	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	21,869	xxx	xxxxxxx
	TOTAL BARS	64	17	14,775,325	3,215,149	88.2	318,533
	Tool steel bars (rolled and forged)	18	18	202,040	57,952	116.3	xxxxxxx
	Pipe and tube—B. W.	15	19	2,836,040	322,287	58.4	xxxxxxx
	L. W.	6	20	845,400	146,221	70.1	xxxxxxx
	Electric weld	7	21	1,149,250	235,084	82.9	xxxxxxx
	Seamless	14	22	3,070,400	523,377	69.1	xxxxxxx
	Conduit	7	23	190,000	15,257	32.6	xxxxxxx
	Mechanical Tubing	11	24	597,800	183,009	124.1	xxxxxxx
	Wire rods	20	25	xxxxxxx	302,405	xxx	62,566
	Wire—Drawn	41	26	2,381,150	493,425	84.0	14,727
	Nails and staples	19	27	1,116,640	217,900	79.1	xxxxxxx
	Barbed and twisted	15	28	482,280	58,241	49.0	xxxxxxx
	Woven wire fence	15	29	754,060	45,543	24.5	xxxxxxx
	Bale ties	12	30	128,420	25,516	80.6	xxxxxxx
	All other wire products	8	31	78,220	15,604	80.9	xxxxxxx
	Fence posts	10	32	115,065	5,379	19.0	xxxxxxx
	Black plate	10	33	339,700	72,916	87.0	
	Tin plate—Hot rolled	5	34	308,620	5,348	4.3	xxxxxxx
	Cold reduced	10	35	3,816,340	489,038	52.0	xxxxxxx
	Sheets—Hot rolled	26	36	xxxxxxx	1,579,057	xxx	44,416
	Galvanized	14	37	xxxxxxx	203,707	xxx	xxxxxxx
	Cold rolled	15	38	xxxxxxx	375,053	xxx	xxxxxxx
	All other	14	39	xxxxxxx	93,496	xxx	xxxxxxx
	TOTAL SHEETS	29	40	13,497,570	2,251,313	67.6	44,416
	Strip—Hot rolled	22	41	3,200,890	382,762	48.5	39,388
	Cold rolled	39	42	2,027,340	273,940	54.0	xxxxxxx
	Wheels (car, rolled steel)	5	43	424,820	54,874	52.4	xxxxxxx
	Axles	6	44	455,470	41,441	37.2	xxxxxxx
	Track spikes	11	45	308,350	37,747	49.6	xxxxxxx
	All other	5	46	42,000	50,815	490.5	xxxxxxx
	TOTAL STEEL PRODUCTS	139	47	xxxxxxx	16,632,962	xxx	1,174,785
	Pig iron, ferro manganese and spiegel	27	48	xxxxxxx	2,262,506	xxx	1,083,387
	Ingot moulds	5	49	xxxxxxx	231,571	xxx	xxxxxxx
Iron Products	Bars	10	50	170,110	25,989	61.9	1,008
	Pipe and tubes	2	51	106,000	23,424	89.6	xxxxxxx
	All other	1	52	56,000	4,283	31.0	-
	TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	xxxxxx	53,696	xxx	1,008

Steel Shipments In First Quarter Heavy

Production of finished steel for sale during first quarter of 1943 has been reported by the American Iron and Steel Institute as 16,632,962 net tons, of which 1,179,785 tons was shipped to other members of the industry for further conversion. Accompanying chart shows production in detail.

Steel plates, sheared and universal, made up the largest tonnage, 3,257,917 tons, with bars second at 3,215,149 tons. Sheets were third highest with 2,251,313 tons.

Total number of companies included in the compilation was 184. During 1942 these companies represented 98.8 per cent of total finished rolled products.

Shift from Wood to Steel for Inland Oil Carrying Vessels

FLEET of 168 all-steel petroleum tank barges, with total carrying capacity of 1,600,000 barrels, will be constructed for operation on the Mississippi and Ohio rivers, the Office of Defense Transportation stated last week in announcing major revisions in the nation's big barge construction-conversion program.

The all-steel welded barges replace 195 wood units on the program authorized last December. It is expected many of the steel boats will be ready for service by late October, when the 21 river towboats which will haul them are scheduled for delivery.

The decision to build 168 steel barges, instead of 195 of the 500 wood units called for in the original program, was affected by several factors, ODT said.

A shift in emphasis to light oils—the so-called "clean products"—as barge cargo made completion of the entire 500 wooden barges impractical, since only heavy residual fuel oil can be moved safely in the wood boats. The all-purpose steel barges, however, will be able to move whatever petroleum products are offered, navigate the upper Ohio River, and operate more efficiently.

The barge conversion program was trimmed from the authorized 259 boats to the 116 which already are converted or are in the process of being converted, because withdrawal of more open-top barges for this purpose would hamper the movement of coal by water and throw an additional burden on the rails.

Big Program Projected

As it stands now, the program calls for:

Construction of 305 wood and composite (wood and steel) barges, capacity 6000 barrels each, 168 all-steel barges, capacity 9500 barrels each; 100 diesel tugboats, of 600 horsepower each; 21 river steam towboats, and 2000 horsepower each; and water-rail trans-shipment facilities at Jacksonville and Panama City, Fla.

Conversion of 116 dry-cargo steel barges to petroleum carriers, average capacity 10,650 barrels.

The 305 wood and composite barges and the 100 tugs will be used as originally planned in the transportation of residual oils from the Texas field along the Gulf intracoastal waterway up approximately to Wilmington, N. C.

The 21 river towboats, the 168 all-steel tank barges, and about 40 of the 116 converted barges will be operated on the Mississippi and Ohio rivers, moving products from the Texas field and from the pipeline terminal at Helena, Ark., to ports as far up as Cincinnati, Pittsburgh, and St. Paul-Minneapolis area.

ODT said barges and Great Lakes tankers will be capable of handling movements into the 17 eastern states comprising district 1 on the following schedule—144,000 barrels a day during the current quarter, 201,000 barrels a day during the third quarter, 175,000 barrels a day during the fourth quarter, and 135,000 barrels a day during the first quarter of 1944—the deliveries tapering off next winter as cold weather hampers operations.

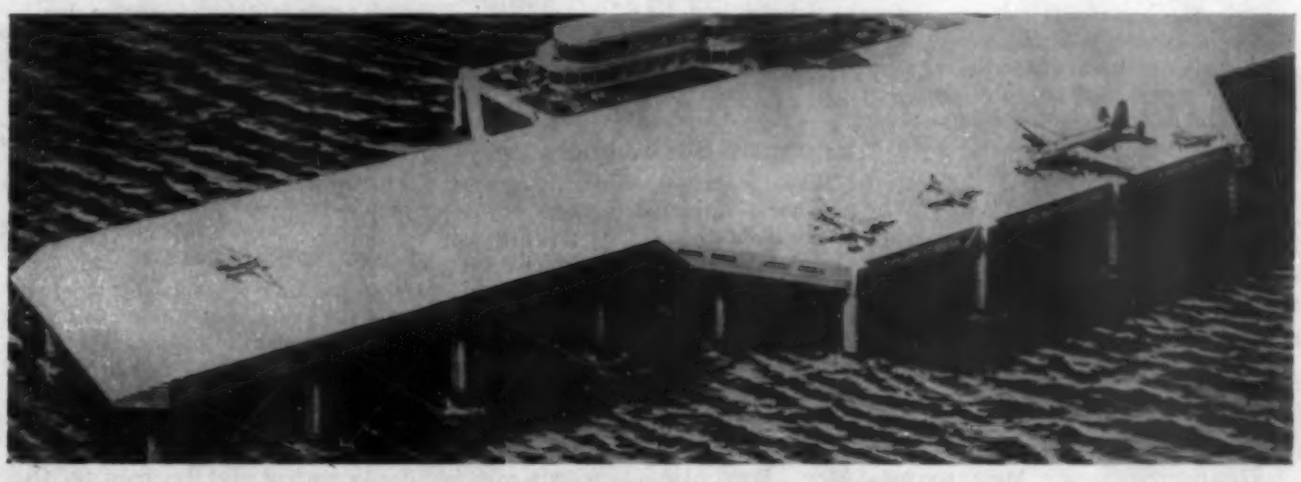
As of May 1, the ODT said, the barge conversion program stod as follows—62 barges completed, 16 barges 90 to 99 per cent complete, 5 barges 80 to 89 per cent complete, 33 barges 1 to 79 per cent complete, and three barges not yet started.

Steel Seadromes Planned for Atlantic Air Route

Plans are projected for a number of mammoth, 64,000-ton seadromes for a proposed Atlantic ocean air route to Great Britain.

Pennsylvania-Central Airlines announces it will seek authority from the Civil Aeronautics Board to establish a line which will call for the building of three huge floating ports. C. Bedell Monro, president of Pennsylvania-Central, states the Sun Shipbuilding & Drydock Co., the United States Steel Corp., the Worth Steel Co., the Belmont Iron works and the John A. Roebling's Sons Co. are sponsoring the project which is expected to begin in the postwar era.

He said the proposed floating airports will be 800 miles apart, would cost $10,000,000, and would require five months to build. They will rest on supports extending 160 feet below the ocean surface and 70 feet above it, and have full airfield facilities including hotels. The dromes will be anchored, he said, but also will have their own propulsion for movement to routes which best suit seasonal conditions in the Atlantic.



Three seadromes—at 800 miles intervals—are envisioned as stepping stones on a trans-Atlantic flight to England by the Pennsylvania-Central Airlines which filed an application with the Civil Aeronautics Board. This is an artist's conception of the island of steel which will have a draft of 160 feet and will rise 70 feet above the surface of the ocean. A mammoth, the seadrome will provide hotel accommodations for travelers.
NEA photo

WINDOWS of WASHINGTON

International WPA?

AMONG real fears that motivate some Republicans in Congress in their opposition to another three-year extension of the Reciprocal Trade Agreements Act is that in the event of a vacancy in the chair of the Secretary of State, President Roosevelt might appoint his friend Harry Hopkins to that cabinet post. Secretary Hull is aging. In discussing possible appointment of Hopkins to his post Congressman Harold Knutson last week asked, "Who would be better equipped to put on an international WPA than he?"

Pointing out that already we have agreed for reversion of our airports, roads and other facilities in Canada to the Canadian government after the war, a number of Republican congressmen are anxious to know whether we similarly will donate to Great Britain and other countries the air bases and other establishments we are erecting on their soil or whether we will insist on benefitting from their use to promote our export trade. Most of them would not oppose extension of the act if they could get assurances that the policy of administering the act will be aimed at defense of our own interests rather than at placating the rest of the world by building up the economies of foreign countries at our expense.

Regarding Patents

The National Patent Planning Commission is about to report to President Roosevelt on that portion of his directive of Dec. 12, 1941, calling for a study of the patent system, with recommendations for any changes that would encourage invention in order that full utilization of the nation's expanded industrial capacity will be made in the peacetime period ahead. Pending release by the White House its details will not be made public. The commission will now proceed with its studies of the second portion of the directive which has to do with the extent to which the government should go, and the ways and means of such procedure, in stimulating inventive effort in normal times with a view of increasing production and employment.

Inventive Progress

Among those at Washington who have had much experience in observing inventive progress, it is generally believed many discoveries that have come about from research aimed at helping the war effort will have a profound bearing on the postwar economy. Many revolutionary discoveries have been made in the field of electronics. There have been numerous important developments in the field of radio. One of the new developments that will have a far-reaching effect has been that of superior fuel which will mean lighter, smaller automobile and aircraft engines which will have higher capacity on less fuel.

At the same time, revolutionary changes in the things we have known should not be expected to come about overnight after the emergency is over. For one thing, scientists and engineers now are occupying their minds largely with the war and are unable to devote as careful attention to future peacetime designs now as they will have at some later date. For another, manufacturers are always keenly aware of the danger of getting too far past the public in design.

AIRCRAFT STEEL

It is estimated here that more than 50 per cent of the alloy steel used by the aircraft industry could be replaced by NE steels. Of this possible changeover, the conversion so far effected by the industry is under 8 per cent, whereas, of the estimated possible changeover for all Army and Navy steel uses, the effected conversion is more than 60 per cent.

The very nature of the aircraft industry, according to the Navy's Operating Committee on Aircraft Materials Conservation, accounts in part for the slower changeover. But with aircraft use now requiring 35 per cent of the chromium and nickel consumed in steel alloying (and at the present rate of changeover this figure shows signs of reaching 43 per cent by the end of the year) the committee is determined that the conversion program must be carried out aggressively and effectively.

Emphasis on Bombers

While production of military aircraft has not yet reached its peak, to be achieved sometime in 1944, it is believed now this production can be attained with existing facilities and expansions already authorized for completion. No further expansion is expected. As has been the case with tanks and a number of other types of ordnance, the point has been reached where production schedules for aircraft are due for adjustments here and there. Principal emphasis right now is on bomber production, particularly two-engine fighter-bombers, weapons which have proved highly effective. In fact, a plant now making a plane recognized as a highly-efficient dive-bomber within a few weeks will change over to the production of two-engine fighter-bombers.

Postwar Puzzler

Intensive thought is beginning to be devoted in higher administration circles to the problem of what to do with government-owned war production plants after the war. While the Secretary of Commerce is the responsible authority over the Defense Plants Corp., Jesse Jones will have to be guided in his decisions by a knowledge as to what plants the Army, the Navy and the Maritime Commission will want held in reserve to meet military needs of the future. Various government departments, particularly the Department of State, will have to be called in for discussion on the extent to which we will continue to manufacture synthetic rubber. Mr. Ickes, as well as the Army and Navy, will have a voice in deciding on future needs of high-octane gasoline. There is a firm disposition not to repeat the mistake, after the first World War, of widespread abandonment and dismantling of war plants.

Army Hush-Hush

The War Department uses three designations in connection with military documents and information. Highest designation—that of "secret"—is given to material whose disclosure might endanger national security. Under that head come war plans, designs and types of new materiel, codes, cryptographic devices, military maps and so on.

Next, is the designation "confidential" which applies to information whose disclosure, although not endangering the national security, might be prejudicial to the interest and prestige of the United States.

Last, and lowest, designation is "restricted," applied to information that is for official use only, or when such information should be limited for reasons of administrative privacy.

By way of comparison, it is interesting to note that the three equivalent British designations, from top to bottom, are: "most secret," "secret" and "confidential."

Farm Tool Markets

Manufacturers of agricultural equipment and garden tools are studying their market distribution programs as a result of findings by the Bureau of Census that in important sections of the country where people brought in much food from other areas they now are producing much of what they consume. One region where the old type of agriculture is being revolutionized is the South. Indications are the South will produce a greater amount of meat in the future.

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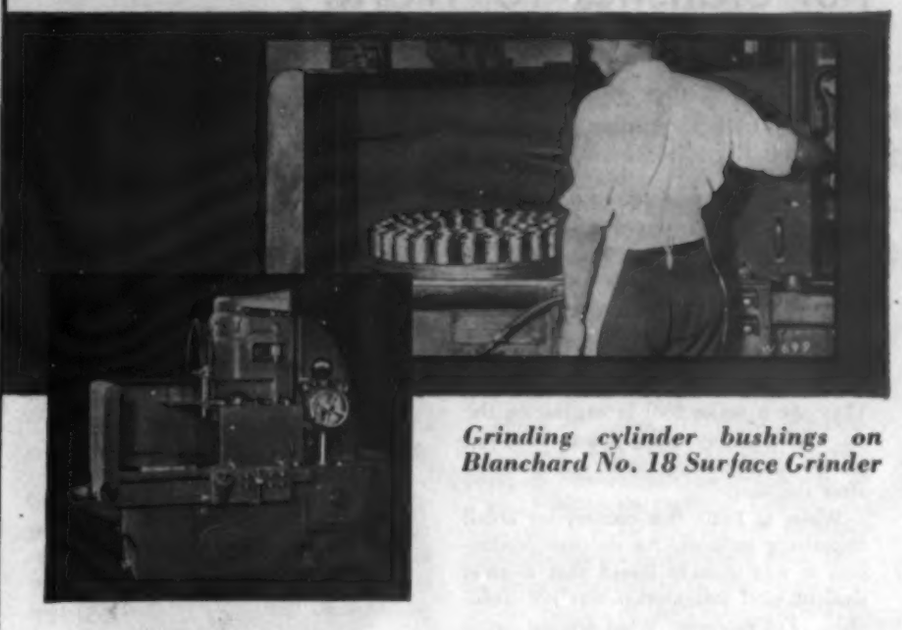

Grinding cylinder bushings on Blanchard No. 18 Surface Grinder

THESE cylinder bushings, 3½ inches high by 3½ inches in diameter, are of extremely thin section, yet they are held securely on the Blanchard No. 18 magnetic chuck. These bushings are Gunite castings. .006″ of stock is ground off both ends to limits of ±.0005″ for size, and .0005″ for parallelism. 50 pieces (100 surfaces) are ground per hour.

Multiple chucking and grinding on the Blanchard is the sure and economical way to machine parallel surfaces on parts such as these, also on collars, gear blanks, and washers.

The Blanchard Magnetic Chuck is so adaptable to holding a wide variety of work that it takes the place of many expensive fixtures that would be necessary on other types of machines.

The BLANCHARD MACHINE COMPANY

64 STATE STREET, CAMBRIDGE, MASS.

Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

Put Statistics To Work!

Census Bureau offers valuable aid to business and industry—both in planning war effort and for peacetime program. . . . Greater use of studies possible

BEFORE the war statistics were just statistics. It was believed in many quarters that a lot of time was wasted in compiling them and that a lot of money could be saved by curtailing such work—without doing any particular harm.

Those ideas have been shattered by the war. Statistics now have "glamor". They are a major tool in organizing the war effort. They will prove to be a major tool in the direction of our economy after the war.

When in 1940, this country set about organizing seriously for defense production it was quickly found that a great deal of vital information was not available. For example: What are our needs for plant and equipment, labor and materials? What plants have we that can produce this or that war machine? Where can we find equipment to do such and such work? Where can we find the labor to execute the program? What is our potential supply of materials? How large a program can we implement?

Questions Plagued Defense Program

These were only a few of the hundreds of questions that arose to plague the initial defense organization, the Advisory Committee of the Council of National Defense, since succeeded in turn by the Office of Production Management and by the present War Production Board. Soon it was found that a vast amount of information would be needed in order to get production of military equipment going on the desired scale. Then it was that the Bureau of the Census, with its large staff of highly-trained statisticians, and its vast assortment of tabulating and other machinery, was called upon to become an important statistical arm of the war program.

It is fortunate that the 1940 decennial census was taken at a time immediately preceding inauguration of rearmament, and also that the information obtained in the 1940 census was so much more detailed than that obtained in any previous census. As it was, however, it was far deficient in detailed information required to organize fully for war. Therefore, the bureau had to devise many new methods of filling the gaps.

Out of its war-time experience a statistical program is being planned that should prove of vast help in enabling to keep the economy under control after the war. The bureau's statistical work has contributed to the conversion of the country's resources available to the war program. It should prove equally helpful in making for a healthy economy in the peacetime period ahead.

Under the necessity of obtaining statistical information almost overnight, accurate results are being obtained by "sampling" methods—similar to those employed in connection with the Gallup poll of public opinion. For example, the bureau conducts a monthly canvass of some 25,000 representative families, thus detecting shifts in our employment trends as they occur. It develops information in other ways, such as by estimating population from results of registrations under the rationing system and by tabulating the records of the Selective Service System.

J. C. CAPT
Director, Bureau of Census

Businessmen should be very much more interested than they generally have been in the statistical work of the bureau, very few of them ever having made full use of the services of the bureau as permitted under the law. The bureau has a tremendous amount of information of vital industrial and business value, so much in fact that it is utterly impossible to assemble it all in printed form. Any businessman requiring any of it can get it simply by paying only the clerical cost of compilation.

Here is a case in point. Sometime ago the publisher of a farm paper visited the bureau and left a list of its subscribers. He wanted to obtain reliable information about economic and cultural level of his farmer "audience". While it is impossible under the law to give out any information whatever regarding individuals (a special law had to be enacted to enable the bureau to give such information to war agencies), it is, on the other hand, perfectly legal for the bureau to give out tabulations representing the average for a group.

In this case the bureau assigned to a number of clerks the job of checking the economic and cultural status of the subscribers to this farm paper. They checked such items as value of crops, whether the land was owned or rented, and—if owned—the value, the number of tractors and other farm equipment owned, etc. These and other details were put through tabulating and calculating machines.

The final tabulation revealed the farmers reading this particular publication enjoy a higher economic and cultural level than that of farmers who do not read it. The publisher has been able to put this tabulation, which was obtained at ridiculously low cost, to extremely effective use in promoting the sale of advertising space. It is all the more valuable in that—being the work of the Bureau of the Census—it must be recognized not only as official, but also as completely unbiased.

Provides Special Information

Quite a number of other businesses and industries—either as individual companies or through trade associations—have obtained special information which has helped them to improve their marketing policies. Considering business and industry as a whole, however, these requests have been surprisingly few. Apparently many businesses have been losing out on a good thing in this connection.

Another reason why business men should be very much interested in the Bureau of the Census is that the bureau is working up a "blueprint" of new services which it will be in a position to render after the war emergency is over, when we begin to change over to a peace economy. Having profited by the lessons learned during the war, the bureau is prepared to conduct current or periodic censuses as required. It has become clear, for example, that existing plan calling for a general census every ten years and biennial censuses of manufacturers, are not sufficient for many purposes. Serious thought is being given to the possibility of a thorough canvass of the entire national economy at intervals certainly no longer than five years apart; and to the possibility of maintaining current statistical series, particularly in those phases of our economy which are subject to great changes in between the bench mark censuses.

The bureau, as a result of its wartime

service, now has a more thorough understanding as to the many different types of information that will be needed in the future for intelligent direction of the nation's economic affairs, both public and private.

In fact, particular stress is placed on the need for more information which private industry can utilize to advantage in charting courses. Officials of the bureau are prepared to talk the thing over with the businessmen, either singly or by industry groups, and work up patterns as to the types of information each industry should have. They already have begun conversations on this matter with staff members of the Committee for Economic Development and it is hoped that considerable progress can be reported in the near future.

Know Cause of 1938 Recession

What sort of information is needed by industry to help it steer a safe course?

The answer depends largely upon the needs of the industry concerned. Recall, for example, the disastrous falling off in steel business in 1938 immediately after the boom year of 1937. What happened, as everybody knows in retrospect, was that consumers throughout the country assumed that demand was going to continue at the 1937 level and loaded up with steel inventories to such large proportions that in many cases they did not consume them until early in 1939.

Many analysts believe that had adequate information such as is now available been available, the impact of this shock would have been greatly minimized. Steel consumers—as well as steel producers—would thereby have been advised of the advance buying by the public and by industry. Then it would have been realized that consumer purchasing would not be as great in 1938 as in 1937 because of our commitments as a result of installment purchases, and consumers of steel would not have built up the big steel inventories they did.

Information which, it is believed, would avert or soften such shocks in the case of steel would be obtained currently with reports issued monthly or at whatever time changing trends required the issuance of warning signals. Roughly, the plan in regard to steel would be something like this:

The pattern would start with raw materials—iron ore, ferrous scrap and coal—then would follow through on successive conversion stocking and marketing phases involving pig iron, ingots, finished rolled sections, fabricated and manufactured goods, thence right on through warehousing, wholesaling and retailing. It would show shifting trends in accumulated inventories at each level, accumulated orders on books, production shipments, capacity, percentage of capacity engaged, prices and other facts of that general type.

Statistics of the Census Bureau together with those of other government agencies would show shifts in the public purchasing power, effects of installment buying on future buying power, trends in government spending for public works, and types of public works involved, increases or decreases in volume of employment, ups or downs in expenditures for private housing and numerous other factors which all together would give a pretty good idea as to what the demands for steel were going to be and how long they would be sustained.

That, in a general way, would be the pattern of information calculated to help the steel producing and consuming industries to control their purchases so that one year would not rob another unduly, which has in the past been one of the contributing causes to the violent depressions which have brought hardships to everybody throughout the country.

The pattern might of course materialize along somewhat different lines than those just suggested. It could be revised or refined quickly so as to include any and all sorts of current information which the steel industry and the steel consuming industries might feel that they should have in order to be able to make most effective use of this "statistical tool". Its exact details of functioning will depend largely on what industry wants at any given time.

Regard "Meter Reading" Highly

Another type of "meter reading" regarded as important would be the determination of which industries are moving up in the national economy and which industries that at any given moment are moving down. That could be of great importance as an indicator of the industries affording the best opportunities for sale promotion at any given time.

A related type of service would be the preparation of reports showing, for instance, the extent to which plastics, wood or aluminum are displacing steel, for what uses, and why. This sort of thing would aim at giving manufacturers and business men basic facts about their competitive positions.

Plans of the bureau, based on demand from private and public sources call for a vast expansion over its job of reporting various current distribution figures. In the past it has reported each month wholesale and retail statistics covering certain types of goods but not covering certain others. A system now is contemplated whereby goods of practically all types will be covered by statistics showing sales, dollar value, inventories together with any other information.

There are other possibilities for rendering special statistical services that any particular industry might wish to request. By way of illustration it may be pointed out that for more than a quarter century the Bureau of the Census has been rendering such special services to the cotton and vegetable oils and fats industries. Every two weeks during the ginning season—usually on the 8th and 17th of the month—it announces statistics for cotton ginnings. Once a month—usually the 30th—it issues statistics covering production and consumption of some 65 vegetable oils and fats.

Statisticians Locked in Chambers

These occasions are quite dramatic. The men who perform the different parts of this compilation are locked in a room up to the moment that the information is to be released. In that way there can be no leaks—there have been no leaks since this work was taken over by the Bureau of the Census. Then, at exactly 10 a.m., the newsmen servicing the cotton and vegetable oil and fat industries and representatives of the telegraph companies, receive the completed reports. Immediately following this official release these reports are transmitted by telegraph or telephone to all important exchanges and newspapers throughout the country.

It is to be hoped that every business executive will take this matter up for personal consideration, either approaching the Bureau of the Census, or seeing to it that his industry approaches the bureau. Industry has much to gain by finding out just what Census can do, and by letting Census know exactly what it needs and what it wants.

A committee, headed by Paul G. Hoffman, president, Studebaker Corp., South Bend, Ind., and composed of well-known business men, has actively underway a program aimed at stimulating a healthy economy after the war. It is a unit of the Department of Commerce. With the aid of an able research staff it is making effective use of the Bureau of Census in setting up an essential statistical system.

If industry embraces this opportunity on a wide scale it thus can from now on help to minimize those severe disturbances to our economy that have caused so much trouble in the past. In this respect the war already has proved the truth of the saying that "a little knowledge may be a dangerous thing". In other words very grave economic danger lies in not having an adequate amount of timely and exact statistical information. Unquestionably this danger can, to a considerable extent, be avoided if business men and industrialists will take full advantage of the highly organized governmental services outlined.

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, May 10, 1943

L ORDERS

L-1-g (Amendment): Trucks, Trailers and Passenger Carriers, effective May 10. Excepts "re-assembled trailers" from prohibition of production of automotive truck trailers as of June 30, 1942. Prohibits use of more than 30% of new iron and steel in production of such re-assembled trailers.

L-30-b (Amendment): Enameled Ware, effective May 3. Provides for meeting export requirements that do not conform to restrictions on sizes and shapes of articles covered by the order when specifically authorized by WPB. Applications for authorization are filed on form PD-556. Provides for filing of appeal form, PD-500, with WPB field offices.

L-30-c (Amendment): Cast Iron Ware, effective May 3. Exempts manufacturing of cast iron kitchen utensils for export from simplification provisions of the order when specifically authorized by WPB. Applications for authorizations are to be filed on PD-556. Provides for the filing of appeal form, PD-500, with WPB field offices.

L-42 (Amendment): Plumbing Fixture Fittings and Trim, effective July 5. Bans use of copper and copper-base alloy in manufacture of any fittings or trim except for limited amounts in 24 specified items. Reduces copper content of several of these items from that permitted in original schedule. Prohibits use of zinc except for coating and for manufacture of specified items, including clean-out plugs, escutcheon holders, flush tank trip lever assemblies, nuts and spuds or inserts. Forbids use of metal in other specified items. Exempts from restrictions products made for laboratories, food packing establishments, hospitals, aircraft and ships where conditions require the use of restricted materials.

L-111 (Amendment): Hand Trucks, Handling Equipment, effective May 8. Permits use of ball bearings of other than alloy steel in swivel bearings or casters used in equipment and permits use of rerolled rail steel as well as bessemer grades where formerly only bessemer was permitted. Specifies that the terms "ball bearings or roller bearings" do not include certain "pin bearings". Restricts use of iron and steel in barrel trucks so that these trucks may not be produced entirely of metal.

L-114 (Amendment): Safety Equipment, effective May 5. Permits use of copper or copper-base alloys (other than nickel silver) for eyelets having a diameter of 1/16-inch or less where steel eyelets cannot be used. Extends from May 31 to Nov. 30 the period during which nickel plating may be used for spectacle type goggles. Permits use of nickel plating for specified parts of oxygen breathing apparatus, inhalators and hose masks to the extent necessary for effective functioning. Permits use of aluminum in machine guards where less scarce material is not practicable.

L-193 (Amendment): Conveying Machinery, effective May 10. Restricts purchase orders to those rated AA-5 or higher. Deletes provision requiring submittal of monthly production and delivery schedules for restricted orders, since scheduling is now covered by general scheduling order M-293. Exempts portable conveyors and slope conveyors used in underground mining.

L-211 (Amendment): Rails and Track Accessories, effective May 6. Permits use of bessemer steel in production of these items. Also permits use of 30- and 33-foot rails in the manufacture of frogs and switches. Exempts from specifications rails used for such items as electrical contact.

L-211 (Amendment): Barbed Wire, Wire Fence, Wire Netting and Wire Flooring, effective May 10. Permits manufacture of additional styles of heavy wire fence. Five additional types of fence which now may be produced are essential to meet demands of the agricultural program. Greater latitude is now permitted also in production of heavy barbed wire.

L-237 (Amendment): Light Power Driven Tools, effective May 3. Prohibits purchase or delivery on ratings assigned by a PRP certificate or applied pursuant to CMP regulations 5 and 5A, except: items with list price on Oct. 15, 1942, of $175 or less; deliveries on purchase orders received prior to May 3, 1943, which have been rated pursuant to CMP regulations 5 and 5A. Purely woodworking tools are exempted from the order.

L-278: Steel Pipe Fittings, effective May 8. Restricts production to specified types and sizes, reducing from 38,784 to 3615 the number of types of fittings which may be produced. Exempts the following types from provisions of the order: those for use on airplanes and ships (other than pleasure craft); conductors or corrosive liquids and gases; those specially designed for combat use; those used to replace special type fittings; and those enumerated in a list of special types.

M ORDERS

M-18-a-1: Chromium, effective May 7. Permits deliveries by processors and dealers without specific WPB authorization in quantities of 3000 lb. or less to a single customer in any one month, provided the material is to be used for metallurgical purposes. Relieves purchasers of quantities within this limit of necessity of filing report forms usually required by order M-18-a. Chromium consumers must continue to file form WPB-532 with Bureau of Mines. All deliveries of chromium remain subject to restrictions of order M-18-a with respect to melting.

M-146 (Amendment): Quartz Crystals, effective May 4. Restores to the order a provision requiring that the purchaser or transferee deliver to the fabricator a certificate stating that he is familiar with the terms of the order and that the material is to be used only for permitted purposes. Alters definitions of certain terms used in the order.

M-199 (Amendment): Silver, effective May 10. Changes manufacturers' quota periods for domestic silver purchases for restricted uses from a monthly to a quarterly basis and excludes, in the calculation of quotas, the amount of silver used by manufacturers in the base period to fill orders rated A-3 or higher. Broadens special exception covering extremely small manufacturers who use domestic silver.

P ORDERS

P-31-a (Revocation): Foundry Equipment, effective May 7. Revokes order which originally permitted extension of priority ratings applied under order P-31 to deliveries of materials for the production of foundry equipment prior to expiration of P-31 on May 30. Material is now obtained under applicable CMP regulations.

PRICE REGULATIONS

General Maximum Prices (Amendment): Mixed Metal Products, effective May 7. Provides formula for determining maximum prices for products that cannot be priced under other provisions of the order. Following commodities are subject to the new provisions: Any tin-base, lead-base, or tin-lead base solder; babbitt, other than branded babbitts; terne metal; and type metal.

No. 6 (Amendment): Iron and Steel Products, effective May 13. Simplifies use of "stranded or distressed" steel mill products in the war effort by establishing maximum charges producers may make for converting or processing iron or steel products which they did not make and do not own. Five main elements entering into the maximum pricing are: no maximum charge is applicable when the material is to be resold by the owner at prices established by schedule No. 6 or No. 49; no maximum charge is specified when the aggregate charge for conversion or processing does not exceed $500; conversion or processing operations on which there are standard published extras shall be charged for according to the published extras but an additional charge not to exceed $5 per net ton is allowed for handling; for operations not covered by the provisions reported above, converter must file his charges with OPA; and charges set forth in the amendment are exclusive of transportation costs incidental to the conversion or processing operation.

No. 77 (Amendment): Beehive Oven Furnace Coke Produced in Pennsylvania, effective May 18. Establishes maximum price of coke made in Barbour county, W. Va., in hand-drawn ovens to which coal has been trucked from mines at $7 per ton. Previously the ceiling was $6.50 per ton.

No. 246 (Amendment): Farm Equipment, effective May 13. Provides wholesale distributors with an additional price adjustment to cover equipment purchased from new sources at prices higher than the distributor paid for similar equipment before March 31, 1942. Permits same mark-up to be applied to such equipment as provided for the equipment purchased at lower prices but in no event may the wholesale distributor's price exceed 80 per cent of the manufacturer's suggested retail list price plus actual freight to him and applicable handling and other charges. The extra charges may not exceed 2% of the manufacturer's suggested retail price. Price adjustment must be based on written authorization by OPA.

No. 272 (Amendment): Cast-Iron Boilers and Radiators, effective May 19. Provides that all transportation charges on less-than-carload shipments from the manufacturer's warehouse to the purchaser's job site may be passed on to the purchaser, if that was the practice of the manufacturer on Oct. 1, 1941. Charges must be shown as a separate item on the purchaser's invoice.

No. 377: Die Castings, effective May 1. Freezes prices of die castings at the lowest levels quoted between April 1, 1742, and April 30, 1943.

Position of Class A Product Orders Under CMP Clarified

Every customer who has received his CMP allotment must (except with respect to small orders and purchases from distributors) accompany every delivery order for a Class A product with an allotment "in the amount required" by his supplier to fill the order, unless the supplier has a sufficient inventory of controlled material to fill the order. The applicable allotment number may be applied to the order, however, for the purpose of up-rating. This was made clear in Interpretation No. 6 of CMP Regulation No. 1.

It was also emphasized that a manufacturer is prohibited from accepting "an

allotment for the manufacture of a Class A product, if he does not expect to be able to fulfill the related authorized production schedule. In addition, an order for a Class A product cannot be displaced by an order subsequently received with preference rating regardless of whether the second order bears a higher preference rating (unless it is a rating of AAA) or is accompanied with a tender of an allotment.

Employers Urged To File Selective Service Report

Employers engaged in war production or in activities essential to support of the war effort should file with Selective Service local boards written evidence of their employment of registrants who maintain bona fide homes with children less than 18 years of age, born on or before Sept. 14, 1942. The Selective Service Bureau of the War Manpower Commission emphasizes the importance of filing this report on Selective Service form No. 42B to assure the employer that, if the time comes when such registrants are needed in the armed forces, he would receive notice of his employes' selective service status.

Materials for Containers Not Considered MRO Supplies

Materials required for the manufacture of containers, in either knock-down or set-up form, are production materials and cannot be obtained under the procedures established by CMP Regulation No. 5, WPB has ruled.

Procedures established in that regulation may not be used to obtain materials for the manufacture of containers, regardless of whether the manufacturer makes them for sale to others, or in a captive plant or separate department, for packaging his own products for shipment. However, material other than fabricated containers, needed to package a product for shipment, may be acquired by the manufacturer of the product under CMP Reg. No. 5 where a captive plant or separate department, whose operations are substantially similar to those of the container manufacturer, is not maintained.

Value of exports from the United States increased 44 per cent during January and February, 1943, to $1,377,000,000, while imports totaled $463,000,000, a 9 per cent decrease during the same period, the National Industrial Conference Board reports. Exports to Latin America declined from $1,035,000,000 in 1941 to $836,000,000 in 1942 while imports of $1,022,000,000 in 1942 were $64,000,000 less than in 1941.

Processing Charges Established On Frozen Steel Inventories

..CONVERSION of frozen inventories of steel mill products to war purposes has been facilitated by OPA in establishing maximum prices steel producers may charge for converting or processing these products which they did not make or do not own.

In the same amendment No. 8 to RPS-6, effective May 13 last, changes were made in the schedule to conform its export provisions more closely to those in the Revised Maximum Export Price Regulation.

Chiefly affected are charges for such processing as re-rolling, cold-rolling and pickling done by the steel mills.

No maximum charge is applicable when material is to be resold by the owner at prices established by RPS-6 or RPS-49; also when the aggregate charge for conversion does not exceed $500.

Conversion or processing operations on which there are standard published extras shall be charged for according to those extras, but an additional charge not to exceed $5 per ton is allowed for handling.

For operations not covered by the above provisions, the converter must file his charges with OPA. Charges set forth in the amendment are exclusive of transportation costs incidental to the conversion operation.

As to export sales, besides stating that maximum prices for them shall be determined in accordance with the provisions of Maximum Export Price Regulation, the amendment includes a summary of the provisions of the export regulation that are particularly applicable to the products covered by RPS-6.

Revised Farm Machinery Ration Order Is Issued by WFA

Revised farm machinery rationing order, combining the amendments, announcements, supplementary orders and interpretations issued since the program was initiated Nov. 28 last, has been issued by War Food Administration. The order enables state war boards to cancel county quotas on all types of quota machinery.

County farm rationing committees are given authority to set the expiration date of purchase certificates between 10 to 60 days after issuance. Certificates may be cancelled at any time after the holder has had a reasonable time to purchase the specified machinery.

A new provision makes it possible for farmers to obtain purchase certificates for fencing, drawn wire, pipe, bale ties, and mill-fabricated water well casing, in excess of the 4000-point limitation provided by the WPB's CMP-4 plan.

Aluminum Product Report on Form CMP-24 Due June 10

All producers and distributors of aluminum products (except ingots) have been instructed to use a new form, CMP-24, to report monthly shipments. The first report is due June 10 and is to cover shipments for the month of May and unfilled orders as of May 31.

CMP-24, CMP-12, CMP-19, CMP-21 and CMP-23 completely replace PD-26A and the following WPB forms: Nos. 46, 47, 48, 59, 60, 61, 62, 63, 65, 66 and 687.

The Aluminum and Magnesium Division has informed producers and distributors who make deliveries in May and June on orders which do not have CMP allotment numbers that they should classify them into the appropriate programs on the new CMP-24 form. If a producer or distributor cannot classify a particular group of orders, he is to attach a letter to the CMP-24 form, giving the government contract number, consumer code, end use, description, and number of pounds shipped.

WPB Division Speeds Idle Materials Into War Work

Redistribution activities of the War Production Board are speeding idle and excessive inventories into direct war uses. Redistribution representatives in the WPB field offices filled 6821 requests for materials or equipment in the first three weeks of April. The largest number was reported from the Cleveland office, where the total was 2256. In the second week of April alone, almost a thousand such requests for assistance were answered satisfactorily by that office.

For this matching of shortages with surplus materials and equipment, the field offices endeavor to maintain up-to-date lists of available supplies. Manufacturers of products for essential war and civilian use who are in need of materials call on the field offices for assistance. Search for the materials is continued for them through the organization up to the Materials Branch of the Redistribution Division in Washington where national inventory records are maintained.

MEN of INDUSTRY

J. B. TYTUS

F. E. VIGOR

E. H. DORENBUSCH

J. CHARLES GALBREATH

J. B. Tytus has been elected vice president in charge of technical development, American Rolling Mill Co., Middletown, O., and **F. E. Vigor** has been elected vice president in charge of manufacturing and mining operations. Formerly vice president in charge of operations, Mr. Tytus is internationally known as the developer of the continuous method of rolling sheets. He joined American Rolling Mill in 1904. Mr. Vigor, until recently, served as assistant director, Steel Division, WPB, Washington. He joined American Rolling Mill in 1910 and was made manager at Ashland in 1929. In 1941 Mr. Vigor went to Washington as member of Iron and Steel Section of OPM, eventually becoming assistant director, Steel Division, WPB. E. H. Dorenbusch, who joined the company in 1911 as traffic clerk, has been made general traffic manager.

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J. F. Metten was elected chairman of board and chief executive officer of New York Shipbuilding Corp., New York. Formerly vice chairman, Mr. Metten succeeds the late Henry Lockhart Jr.

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Adam MacKenzie, vice president in charge of manufacturing, Carboloy Co. Inc., was elected chairman, Detroit section, American Institute of Mining and Metallurgical Engineers recently.

—o—

Horace E. Coyl, in charge of tank car sales; **Donald H. Smith,** in charge of traffic department; and **William J. Stebler,** in charge manufacturing plants, Sharon, Pa., have been elected vice presidents, General American Transportation Corp., Chicago. **Cyrus L. Philipp,** vice president, will direct sales while continuing in charge of operation of refrigerator cars including those of Union Refrigerator Transit Lines division, Milwaukee. **O. J. Parks** has been appointed mechanical assistant to first vice president, and **Edward J. Campbell** becomes chief maintenance officer. **J. C. Acworth,** in charge of mechanical and repair parts, now is an assistant vice president.

—o—

L. R. Dohm, formerly secretary and treasurer, Warren Foundry & Pipe Corp., New York, has been elected president to succeed **Leonard Peckitt,** who has retired.

—o—

Arnold Tietig III, formerly vice president and treasurer, Metal Specialties Co., Cincinnati, has been elected president to succeed the late **Vernon B. Chase.** He will retain the title of treasurer also.

—o—

Melbourne H. Steil, formerly assistant general superintendent, has been made general superintendent of shops, Beloit Works, Fairbanks, Morse & Co., Beloit, Wis., succeeding Ray Saveland, resigned.

—o—

L. C. Campbell has been elected vice president, Eastern Gas & Fuel Associates in charge of Koppers Coal Division, Pittsburgh. General manager of mines for Koppers Coal Division since 1941, Mr. Campbell succeeds the late P. C. Thomas.

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C. J. Maloney, Chicago district manager, Cutler-Hammer Inc., has been elected president, Electric Association of Chicago for the 1943 term.

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August E. Klinger has been elected president, Buffalo Steel Co., Tonawanda, N. Y. Vice president since 1931, Mr. Klinger joined the company in 1907. In 1914 he was made manager of the New York office, and in 1921 he was placed in charge of general sales at the main office.

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Paul H. Hill, formerly with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been named sales manager of Schwarze Electric Co.; and **Charles H. Brown,** assistant sales manager and advertising manager. **M. I. Bradley,** formerly plant manager of Lycoming motors division, Aviation Corp. of America, has been made production manager.

—o—

J. Charles Galbreath has been made vice president, Plomb Tool Co., Los Angeles. In assuming his new office, Mr. Galbreath will also retain general supervision of the company's contract department. **Berado Perez-Fraga,** former traffic representative for Pan-American Air Lines, has been appointed to export department.

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C. P. Shropshire, traffic manager at the Stinson Division of Consolidated Vultee Aircraft Corp., Nashville, Tenn. who has been on special assignment with the Army Air Forces, has completed the assignment and will return to his position at the Tennessee plant.

—o—

Millar Brainard has been elected treasurer, Cleveland Automatic Machine Co., Cleveland, to relieve **Col. James Hammond,** president, of those duties. **James J. Laughlin Jr.** of law firm of Miller & Hornbeck, Cleveland was named a director of the firm.

—o—

L. A. Shea has been made district manager for the Chicago territory of Henry L. Crowley & Co. Inc., West Orange, N. J. Mr. Shea comes to his present post from Burgess-Norton Co., Geneva, Ill. **Ralph Hulton,** formerly development engineer with Keystone Carbon Co. Inc., St. Marys, Pa., has been appointed field engineer in the Ohio and Michigan territories.

—o—

B. E. Kibbee, vice president, Sharon Steel Corp., Sharon, Pa., has been elected treasurer. Succeeding the late **J. Reid**

FRED O. BURKHOLDER

C. W. PEARSALL

WAYNE D. DUKETTE

ROLAND W. BURT

Evans in that post, Mr. Kibbee will continue also as vice president. Other officials, including **Henry A. Roemer,** chairman and president, were re-elected.

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Fred O. Burkholder, vice president, Ahlberg Bearing Co., Chicago, has been elected president to succeed the late **C. J. Bender.** He joined the company in 1915. **C. W. Pearsall,** general sales manager, has been named vice president. Mr. Pearsall and **Charles Nelson Jr.,** chief engineer, have been elected directors.

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Judson C. Travis, formerly assistant to president, Handy & Harman, New York, and recently elected to the board of directors, has been elected vice president in charge of sales. Other officers including **C. W. Handy,** chairman, and **G. H. Niemeyer,** president, were re-elected.

—o—

Carl King has been made general superintendent of Wickwire Spencer Steel Co., Palmer, Mass., plant, and **F. G. Lindstrom,** superintendent of manufacturing operations.

—o—

Roy E. Smith, formerly division manager of Armco Drainage & Metal Products Inc., Middletown, O., has been appointed sales manager of Kelly O'Leary Steel Works, Chicago.

—o—

Elmer J. Kopf, formerly of Advertising Division, Republic Steel Corp., Cleveland, has joined G. M. Basford Co., New York, where he will handle advertising of accounts in steel and metalworking industries.

—o—

Wayne D. Dukette has been appointed manager, railroad sales department, Joseph T. Ryerson & Son Inc., Chicago, succeeding **J. P. Moses,** who will continue in an advisory capacity. Assistant sales manager, Chicago plant for the past seven years, Mr. Dukette has been associated with the Ryerson Co. for 29 years. **Roland W. Burt** will continue as manager, eastern railroad sales, Jersey City plant.

—o—

Leigh Willard has been elected a director of the Allis-Chalmers Mfg. Co., Milwaukee, Wis. Mr. Leigh is also president and a director of the Interlake Iron Corp., Chicago.

OBITUARIES . . .

Clarence L. Jack, vice president and director of purchases, Jack & Heintz Inc., Bedford, O., died May 9 in Cleveland.

—o—

R. W. Kaltenbach, 74, president and treasurer of the R. W. Kaltenbach Corp., Cleveland, died May 8 in that city.

—o—

Edward F. Niedecken, 71, inventor and president of Hoffman & Billings Mfg. Co., Milwaukee, Wis., died May 8 in that city.

—o—

Charles R. Youmans, 63, for 25 years president of Youmans Machine Co., Cleveland, and since 1932 chief inspector of the Steel Improvement Forge Co., Cleveland, died recently in that city.

—o—

Frederick Lincoln Fuller, 82, a pioneer in the development of cash registers, who was in charge of the laboratories of the International Business Machines Corp., in East Orange, N. J., died recently in Llewelyn Park, West Orange, N. J.

—o—

Neil L. Copeland, 49, purchasing agent, Climax Molybdenum Co., Denver, Colo., died recently in that city.

—o—

Carl M. Nicholson, president, Master Rule Mfg. Co., Ossining, N. Y., died May 9 in that city.

—o—

Francis L. Ives, engineer, Allis-Chalmers Co., died April 30 at Milwaukee.

—o—

Col. Percy E. Barbour, 67, New York consulting mining engineer and international authority on the economics of copper, gold and silver, died May 4 in Lima, Peru.

—o—

Angus MacArthur, 54, vice president and director, Koppers Co., Pittsburgh, died May 9 at Old Greenwich, Conn. Mr. MacArthur was general manager of the gas and coke division with headquarters in New York.

—o—

John W. Towle, president and one of the founders of the Omaha Steel Works, Omaha, Nebr., died April 30 in that city.

—o—

Wellington B. Lee, 76, retired president, Track Specialties, New York, died May 3 in that city.

—o—

Alfred J. Schmidt Sr., retired president, Consolidated Stamp Mfg. Co., New York, died May 4, in Suffern, N. Y.

—o—

John Gillen, 70, founder and for 33 years owner of John Gillen Co., Chicago, died May 4 in Berwyn, Ill.

—o—

Lee A. Moore, 63, sales manager, Champ Spring Co., St. Louis, died April 26 in that city.

—o—

John P. Meyer, 79, one-time president, Granite Bi-Metallic Co., St. Louis, died April 29 in that city.

soldiers who live in Foxholes

better not throw "DUDS"!

'Blast 'em, baby — and don't be a dud!"

This may well be the silent prayer of the soldier in a foxhole who throws a hand grenade at the tread of an onrushing enemy tank. To be sure it will explode, the solid cake of pure TNT is well protected from rust and water.

This is why *bonderized* ARMCO ZINCGRIP-PAINTGRIP sheets are used for the base of the new grenade. The extra protection of this bonderized galvanized sheet is needed because ordinary metal might rust when the grenades are shipped or stored in tropical atmospheres.

ARMCO ZINCGRIP-PAINTGRIP fills the bill perfectly. It provides a paint-gripping galvanized surface that *takes* and *preserves* paint (the container is painted inside and out). And it assures a zinc coating that does not flake or peel when the base of the grenade is drawn in a press.

Our fighters use the deadly missile to blow treads off tanks. It is also employed in "sapper" operations, booby traps and other jobs. Threads at the top hold the fuse that is attached when action looms.

We are producing special-purpose metals for Victory products now. But remember, when the war is won ARMCO will have new technical knowledge and new kinds of iron and steel sheets that will help you make better products for America's brighter future. Can you use information now in designing your post-war products? The American Rolling Mill Company, 791 Curtis St., Middletown, Ohio.

ZINCGRIP-PAINTGRIP ★ ARMCO ★ INGOT IRON

THE AMERICAN ROLLING MILL COMPANY

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

"Pacific Rim" market offers large possibilities for West Coast aircraft plants in postwar era. . . Emphasis may be placed on lighter consumer goods rather than automobiles

LOS ANGELES

WITH aircraft manufacturing now the nation's top-ranking industry, and with the West Coast occupying the No. 1 spot for airframe manufacturing, the most pressing question which businessmen ask each other sitting around the luncheon table is: What will these overnight giants be doing after the war? Will they be manufacturing automobiles? How can they keep the hundreds of thousands they now are employing still occupied with some useful productive labor?

No one can vouchsafe a certain answer. The solution is wrapped up in a host of "ifs", the principal one being the date of the war's end. This much can be said for sure, after a tour of virtually all the airplane plants on the West Coast, and after conversation with some of the leading officials in these plants, with workmen in the plants and with people whose life is wrapped up intimately in the West Coast: Every effort is going to be made to keep the best of the West Coast plants going, no matter whether on airplanes, on refrigerators, on stoves, on automobiles or anything else you can figure out.

Hard realism compels the observation that by no stretch of the imagination can airplane production ever be continued on the present basis, roughly 6000 ships a month. Even assuming a world patrolling job to be undertaken by the U. S. no such quantities of combat craft could possibly be absorbed because, without active combat, losses from obsolescence and accident could not conceivably reach this total.

The editor of this page for the past six weeks has been visiting industries of the Pacific Coast, from Los Angeles to Seattle, in the attempt to obtain first-hand impressions of industrial activity there—as it is now and as it may affect the postwar world. Until his return to Detroit, regular dispatches from the motor city necessarily are suspended.—The Editors.

Granting this fact, it becomes obvious the vast aircraft plants will have to be converted to some form of consumer goods manufacture, and the most immediate product is the automobile. There are more words being wasted in print and in conversation about the West Coast aircraft companies going into the automobile business after the war than about any other subject that comes to mind. The idea was suggested in this department about a year ago as a result of discussions in Detroit on the matter; but after a first-hand inspection of practically all the aircraft plants on the Coast, the opinion is offered here for what it is worth that the automobilization of the aircraft plants may not be as easy as it sounds. In the first place, the Coast is practically devoid of engine-building facilities, which would imply the necessity of building engines in the Middle West and shipping them to the Coast. In the second place, aircraft plants, outside of their machining departments, which as a rule are beautifully equipped with the latest and best types of machine tools (in some cases apparently far over-equipped for most efficient utilization), are not particularly suited to automobile manufacture as it is now known. They have the plant buildings—in most cases light structural steel framing covered with corrugated galvanized steel sheeting—and a large assortment of fuselage and wing jigs, usually served by light overhead cranes suspended from

Kaiser's magic isn't done with mirrors: Some of the thousands of shipyards workers, many imported from other areas, watch a launching at a Henry J. Kaiser yard in Southern California. NEA photo

parallel rows of roof girders, but they do not have the welding equipment or the press equipment or the conveyor equipment which would lend itself to conversion to automobile manufacture.

From casual observation and not from any official source, it is this writer's opinion that the aircraft plants may perhaps be more interested in other types of consumer goods manufacture, despite the fact some of them will admit having design for automobiles in the drafting-room stage. For example, the Los Angeles Chamber of Commerce has been currently making market studies for some 20 companies, most of them in or allied with aircraft manufacture, concentrating on products which have not been produced in any great quantity on the West Coast. This would include such things as refrigerators, radios, stoves, washing machines, vacuum cleaners and related types of household appliances.

Certain officials of the Kaiser interests freely admit their engineering development section, operating entirely apart from the many and varied Kaiser manufacturing divisions, has an automobile "ready" for production. Just what it is they will not say, but there are grounds for believing that it is a light-weight, low-price, high-economy car. However, even granting such a vehicle could be or would be placed in production, there remain the imposing problems of merchandising and distribution.

Further, it may well develop that when such a car is placed in production, it will be in the Detroit area and not on the West Coast, for it still remains a fact that the Rocky Mountains divide the West Coast and its 10 per cent of the nation's population from the remaining 90 per cent, and as C. E. Wilson, president of General Motors recently told a West Coast group, "we will ship across the Rockies only once—whether it be raw materials, subassemblies or finished products."

Study Markets of "Pacific Rim"

The economy of this slant, distilled from years of peacetime operations, is hard to refute. There is no reason to suspect that newcomers will find the situation materially changed.

Perhaps the larger opportunities for the West Coast manufacturers, present and future, lie in the so-called "Pacific Rim", a phrase used to identify the consuming markets ranging from Alaska on the North down through Japan (yes, Japan), China, India, Australia, South America, Central America and Mexico. The vast potentialities of this consuming area are virtually unknown and untested, but it is a favorite stamping ground for the dreamers and planners for postwar industry. It should not be overlooked.

Eminence of the state of California, and Los Angeles county in particular, from the standpoint of population, area, number of motor cars, diversity of commercial activity, and pleasant climate has long been the subject of promotional activity by chambers of commerce and other civic groups. War has enhanced even further these myriad advantages, with the exception of climate which perhaps has deteriorated somewhat from normal, by virtue of an abnormal acceleration in industry activity, led by aircraft and shipbuilding.

Forty per cent of the airframes produced in the country come from the handful of producers in southern California. Their employment has risen from 16,000 in 1939 to 26,000 in 1940, 58,000 in 1941, 122,000 in 1942 and now over 200,000. Manufacturers of aircraft parts and accessories numbered 125 in 1941 and employed about 30,000; 320 in 1942 and employed 50,000; and 866 in 1943, employing over 100,000. It is estimated that the aviation business accounts for about one-third of the county's gainfully employed.

Behind Detroit in War Contracts

Thanks to a big backlog of orders for military aircraft, Los Angeles county ranks second only to Detroit in volume of war contracts received, and in this connection local boosters point with pride to the fact that the area ranks only tenth in the amount of government funds allocated for new plants and facilities. This is taken to indicate that West Coast private capital has been more plentiful and more willing to support new industrial activity.

But along with aircraft there has come to California a steady build-up in the heavier types of basic industries, on which the Coast once looked to the East for support. Aluminum and magnesium reduction and fabrication plants; the Kaiser steel plant at Fontana which hopes before long to be rolling at a rate of 820,000 tons of carbon and alloy steel a year; 55 synthetic rubber projects involving production of styrene, butadiene and their copolymerization; 60 aluminum foundries and scores of iron, steel and malleable foundries; 14 major shipbuilding companies with perhaps 50 more smaller ship and boat builders; a rubber tire industry which in peacetime was second only to Akron, O., in volume of production; automobile assembly plants which in 1941 assembled 80 per cent of the new cars available on the West Coast; 64 suppliers of molded plastics—and so on down the list.

The latest census of manufactures showed 5800 manufacturing plants in Los Angeles county, but this includes many small operators such as power laundries and the like. A better indication may be the fact that the Los Angeles Chamber of Commerce has 5000 member companies making it the largest chamber in the world, and even twice the size of the large Chicago Association.

The important part the Los Angeles area assumes in the nation's vast wartime shipbuilding program is striking testimony to the boom in industrial activity in the West and is an important explanation thereof. It is estimated that 53 per cent of the United States Maritime Commission's program for cargo carriers is being handled in Southern California. Yards there last year launched some 140 large ocean-going ships, including freighters, transports, naval repair ships and destroyers, plus large numbers of smaller naval craft.

Cargo ships alone numbered about 130 and totaled 1,400,000 deadweight tons, or a sixth of the United States total. Official goal for the country this year in cargo ships has been announced as 19,000,000 tons, against 8,000,000 tons last year, and Los Angeles yards have been keeping up with this accelerated program, launching vessels currently at a rate of about 2,500,000 tons a year.

California Shipbuilding Corp. at its yard on Terminal Island launched 111 ships in 1942, surpassing any other yard in the country. All vessels were of the Liberty ship type.

Remarkable Shipbuilding Record

The shipbuilding record is all the more remarkable when it is recalled that prior to 1940 no large ship had been built in southern California in over 20 years.

In 1939, Los Angeles county ranked fifth in industrial production of all counties in the country. Three years have further enhanced the stature, but exact figures are not obtainable.

Los Angeles is definitely a motor city, having the highest concentration of automobiles of any metropolitan area in the country. Population is close to 3,000,000 and registered cars total 1,000,000, or one car for every three people. Not only are there lots of cars but their owners probably drive greater distances than most places in the country. The reason is that the county is spread out over 4115 square miles and it is not uncommon for working people to drive 10-20 miles each way to and from places of business. Further the area is fortunate in having one of the finest networks of broad, well-paved highways of any section of the country. This, together with the thousands of scenic spots in the area, and the well-known climate, adds up to a high degree of motor car operation in Los Angeles.

Situation WELL IN HAND

Our quality sand and permanent mold aluminum castings are helping many producers of finished and semi-finished war materials to keep the "Situation Well In Hand" on the production front. Over thirty years of experience, thorough research, careful supervision and unmatched craftsmanship have made us one of the largest producers of sand and permanent mold aluminum castings. TENUAL Aluminum Castings are meeting today's demands—assuring tomorrow's needs.

TENUAL

ALUMINUM CASTINGS

Photograph shows one of our battery of squeezer machines. Man is using hand tampers. With speed all important these days, squeezer machines are playing a vital part in the mass production of castings.

BUY U. S. WAR BONDS & STAMPS

THE NATIONAL BRONZE & ALUMINUM FOUNDRY CO.

CLEVELAND, OHIO

NEW YORK—111 Broadway • CHICAGO—105 W. Randolph • DETROIT—Stephenson Bldg. • LOS ANGELES—405 S. Hill

MAKERS OF QUALITY SAND AND PERMANENT MOLD ALUMINUM CASTINGS

First official Army citation to be conferred upon a civilian in the present war is presented, above, by Gen. Levin H. Campbell, chief, U. S. Army Ordnance, to George E. Whitlock, second from left, president, Mullins Mfg. Corp., Youngstown. Marshall Adams, left, advertising manager., and Jacques Stanitz, director of engineering development, both of the same firm, look on

Maurice A. White, president, American Gear & Mfg. Co., Chicago, speaks at the "E" pennant ceremony

Displaying "E" burgee presented to Ladish Drop Forge Co., Cudahy, Wis., are left to right: Lieut.-Col. Edward H. Bowman, Army Air Corps; Herman W. Ladish, company chairman; Otto Retzloff, an employe, and Capt. D. D. Dupre, commandant, Naval Officers' Training Corps, Marquette University

Metalworking Companies Cited by Armed Services

Joint Army-Navy "E" awards for outstanding production of war materials were announced recently for the following metalworking and metalproducing companies:

Annapolis Yacht Yard Inc., Annapolis, Md.

Arlington Millwork Co., Arlington, Va.

Blaw-Knox Co., Lewis Foundry and Machine Division, Groveton, Pa.

Blaw-Knox Co., Martins Ferry Division, Martins Ferry, O.

Boyertown Auto Body Works Inc., Boyertown, Pa.

Brown & Root Inc., and W. S. Bellows Construction Co., McAlester, Okla.

A. M. Byers Co., Byers Plant, Economy, Pa., and Southside Plant, Pittsburgh, Pa.

Crucible Steel Co. of America, Halcomb Works and Emerson Avenue Works, Syracuse, N. Y.

Raytheon Mfg. Co., Equipment Division, Power Tube Division and Radar Division, Waltham,

Mass.; Small Tube Division, Newton, Mass.
Dow Chemical Co., Freeport, Texas, and Dow Magnesium Corp., Velasco, Texas.
Geometric Tool Co., New Haven, Conn.
Gilbane Building Co. Inc., Newport, R. I.
Goodyear Aircraft Corp., Arizona Division, Litchfield Park, Ariz.
Kidder Press Inc., Dover, N. H.
I. F. Laucks Inc., Plant No. 1, Seattle, Wash.
Lombard Governor Corp., Ashland, Mass.
W. F. Mosser & Son, Allentown, Pa.
National Battery Co., Depew, N. Y.
New England Tape Co. Inc., Hudson, Mass.
Patch-Wegner Corp., Long Island City, N. Y.
Reliance Mfg. Co., Beacon Plant, Loogootee, Ind.
Rice Barton Corp., Worcester, Mass.
Sullivan Machinery Co., Michigan City, Ind.
Pratt & Whitney Aircraft Division of United Aircraft Corp., Longmeadow Plant, East Longmeadow, Mass.
Treadwell Construction Co., Midland, Pa.
Union Boiler & Mfg. Co., Lebanon, Pa.
Pratt & Whitney Aircraft Division of United Aircraft Corp., Willimantic, Conn.
United Welding Co., Middletown, O.
Universal Engineering Co., Frankenmuth, Mich.
Walsh Construction Co., J. Rich Steers Inc.; Cauldwell Wingate Company, Raisler Corp., New York Navy Yard, Brooklyn.
Wise Contracting Co. Inc., and Virginia Engineering Co. Inc., Yorktown, Va.
American Locomotive Co., Latrobe, Pa.
Brass Foundry Co., Peoria, Ill.
Mueller Co., Decatur, Ill.
National Enameling & Stamping Co., Granite City, Ill.
Protectoseal Co., Chicago.
John Royle & Sons, Paterson, N. J.
Thomson Co., Thomson, Ga.
Vaughan Novelty Mfg. Co. Inc., Chicago.
Aviation Corp., Republic Aircraft-Products Division, plants No. 1 and 2, Detroit.
J. Bishop & Co., Malvern, Pa.
Century Metalcraft Corp., Manufacturing Division, Los Angeles.
Chicago Screw Co., Chicago.
Michigana Products Corp., Michigan City, Ind.
National Supply Co., Torrance, Calif.
Ohio-Apex Inc., Nitro, W. Va.
Ohio Tubular Products Co., London, O.
Rogers Pattern & Foundry Co., Los Angeles.
Sears Co., Davenport, Ia.
Shakespeare Co. and Shakespeare Products Co., Kalamazoo, Mich.
Union Dental Instrument Mfg. Corp., Philadelphia.
Universal Engineering Corp., Cedar Rapids, Ia.
Watling Mfg. Co., Chicago.

Human Hair May Damage Roll Surface

Highly finished surface of steel strip made for one customer of American Steel & Wire Co., U. S. Steel subsidiary, is so nearly perfect that material not quite up to the rigid standards—revealing some slight surface blemish—is still satisfactory for fabrication of small mirrors used in toilet cases.

The profilometer test, standard test used to show surface roughness, discovers unevenness of surface amounting to as little as one or two millionths of an inch. The rolls used to finish the surface are 18 inches in diameter and 32 inches wide, require special grinding and polishing to provide the proper mirror finish to the product. So delicately are the rolls finished that allowance is made in grinding for the minute bend which develops in the center upon application of the tremendous pressure required. A human hair can damage the surface of the roll.

Functions, Organization of Operations Office Formalized

FUNCTIONS and organizations of the office of Donald D. Davis, WPB vice chairman for operations, were formally outlined last week in an administrative order issued by Charles E. Wilson, executive vice chairman.

Mr. Davis' office, together with the three Controlled Materials Divisions, is responsible for the execution of established WPB plans, policies and general methods. To achieve this objective, the office performs the following major functions:

1. Determines the present and anticipated supply of and requirements for critical resources.

2. Eliminates less essential uses of critical resources.

3. Increases supply of critical resources.

4. Directs the flow of critical materials.

5. Schedules the production and delivery of critical components and end products.

DONALD D. DAVIS

6. Directs the utilization of facilities to maintain schedules and, in general, assures the best utilization of existing productive facilities and available manpower.

The administrative order makes Mr. Davis a member of the WPB requirements committee in order to act as claimant for maintenance, repair and operating supply requirements of the industry divisions as well as for "B" products other than consumer goods and services.

Utilization of facilities and the scheduling of production of critical components will be handled by a new Production Division. The position of scheduling officer has been abolished and its responsibilities transferred to the new division.

Appointments-Resignations

William C. Macdonald has been named deputy director of the Plumbing and Heating Division, WPB. Mr. Macdonald had been associated with the Housing Branch of the Construction Division since October, 1941, and previously held the position of general sales manager of the Maryland Sanitary Mfg. Corp. of Baltimore.

Samuel B. Jones Jr. has resigned as New England manager of the War Production Board's Available Inventory Division to resume his post as regional manager of the American Rolling Mills Co. at Boston. His successor is John W. Perry of Boston, formerly assistant manager of the division and a former Massachusetts and Maine state manager of the Frigidaire division of General Motors Corp.

John G. Strange has resigned as chief of the War Products Development Section, Pulp and Paper Division, War Production Board, and will be succeeded by R. J. Zaumeyer of Kimberly-Clark Corp., Neenah, Wis. Mr. Strange will return to his duties as secretary of the Institute of Paper Chemistry, Appleton, Wis.

R. C. Spencer of the Lowe Paper Co., Ridgefield, N. J., has been appointed deputy chief of the section, replacing Herman Whitmore who returns to active duty with the Robert Gair Co., New York. W. H. Swanson, another member of the section, resigned to resume his activities with the Kimberly-Clark Corp.

H. W. Dodge, vice president and general sales manager of the Texas Co. and formerly deputy director general for staff, WPB, has been appointed director in charge of the New York office of Petroleum Administration for War, with jurisdiction over all of the East Coast.

Ingersoll Rand Co., New York City, manufacturer of air compressors and compressed air operated tools, is campaigning against the waste of compressed air to help speed production through a series of five industrial posters graphically illustrating the problems. Copies of the posters, which have a definite educational value, are obtainable through the company's office, 11 Broadway, New York city.

Will Scrap's Burden Be Heavier?

Drain on stockpiles may be increased by reduction in projected movement of ore during the 1943 shipping season on lakes

ALTHOUGH the War Production Board last week revised downward the 1943 season's iron ore shipments to 91,000,000 gross tons, third revision since last fall when the goal was tentatively set at 100,000,000 tons, the "improved" condition of scrap stocks is expected to offset the reduction in iron ore supply available to the steel industry.

Steel officials are hopeful there will be no scrap or iron ore shortage to hinder steel production during the forthcoming year. Ore shippers, however, state it is unlikely the 1942 shipment total will be exceeded unless a late navigation season is made possible by good weather.

Somewhat milder weather over the last few weeks has eased the shipping situation in the upper lake regions. Loaded vessels are moving through the Soo at an increasing rate. A number of ore vessels were tied-up in Buffalo harbor because of ice conditions, but vessels are now moving up the lakes, Coast Guard cutters having cleared the ice jam. Shippers now believe the ore fleet will be operating at capacity within a few weeks. At that time loading will range around 400,000 tons each day, whereas, recently the average has been only slightly better than 280,000 tons. ODT has restored preferential treatment to ore cargoes.

Some dealers report scrap stocks as "comfortable" stating that enough scrap is on hand to support near-capacity steel operations into late fall. But the general overall picture in scrap is not so encouraging since there is a disproportionate amount of the less desirable grades available.

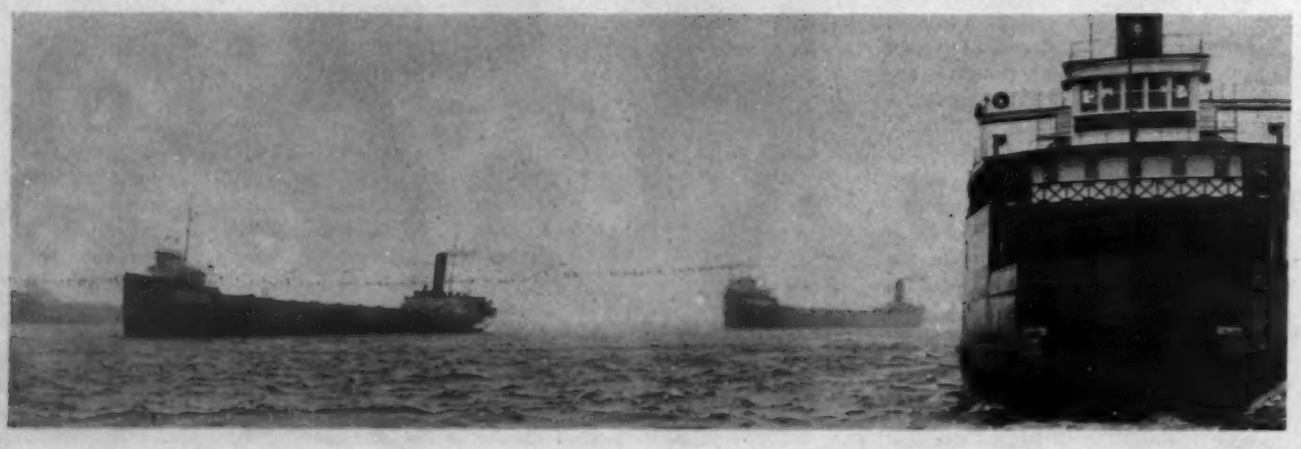
While the overall scrap situation appears promising, factors in the situation serve to temper optimism. For one thing, it is pointed out, a coal strike would have repercussions in the scrap market since lessened pig iron output would increase the demand burden on scrap to the extent that existing supplies would not be sufficient to support capacity operations for a long period.

The War Production Board is urging steel producers to increase their scrap inventory to a 60-day supply. At present the average supply ranges about 45 days and in many instances is lower. St. Louis, Chicago, and Lackawanna, N. Y., are reported troubled by low scrap inventories.

Scrap dealers say that during 1943 steel producers will have to rely almost entirely on production scrap since auto graveyards, street car tracks, and heavy factory scrap virtually has been "cleaned-up" throughout the country. Shipments of scrap have been received in steel producing areas from many sections of the country, including the Southwest. Within the last three weeks consumers have been accepting turnings and borings in order to push blast furnace capacity.

There are several factors which apparently will influence the ability of ore shippers to make the season goal of 91,000,000 tons. Most important single factor is weather. Warm weather late in

Steel producers are attempting to build up scrap inventories as a hedge against possible lower supplies of iron ore caused by the late opening of the shipping season. At right, a typical scrap stockpile. Below, ore carriers waiting to pass through the Soo. Carferry SAINTE MARIE *aided in clearing a path through the ice. NEA photos*



the fall and absence of delaying fog would greatly enhance vessel movements. Concentration of ships in the ore trade, addition of new ore carriers to the fleet, and entry of Canadian vessels are contributing factors. Prospective iron ore requirements have decreased slightly because a number of blast furnaces are expected to shut down for repairs and because the steel expansion program is behind schedule.

Ore stock on hand at furnaces and docks in the United States and Canada on April 1 was 25,088,209 tons, according to the Lake Superior Iron Ore Association. Consumption during April is estimated at approximately 7,000,000 tons and shipments from upper lake ports 1,954,817 tons during the same period. Thus, the estimated stock on hand as of May 1 this year is about 20,000,000 tons, compared with almost a similar amount of 20,064,744 tons at the same time last year. A decrease of about 12,743,294 tons has occurred in ore stocks since March 1, 1943, when they were estimated at 32,743,294 tons. The drop was occasioned by the delay in opening of lake navigation due to bad weather. Fleet capacity will be increased by 16 Maritime Commission ships soon to be placed into service.

Seek To Co-ordinate Methods In Renegotiating Contracts

MORE THAN $2,500,000,000 has been recovered for the government by contract renegotiation. This represents total of work done by the Army, Navy, Maritime Commission, War Shipping Board and the Treasury Department since the beginning of the renegotiation work.

At Pittsburgh last week an indoctrination meeting was held for all representatives of these agencies in renegotiation work. Representatives from all parts of the country participated. The meeting was designed to co-ordinate methods and to instruct renegotiators so that the job done on every company would be uniform and in line with standards established by the Renegotiation Act.

To date the Army and Navy work has progressed more rapidly than the other organizations. Maritime Commission is making a fair start, while the War Shipping Board and the Treasury are now establishing organizations.

The primary requirements of the program is manpower. The need is for men equipped with a sound financial background and well acquainted with industry generally so that the industries being renegotiated can be assured a fair deal from a man who understands their problems. According to representatives of the various agencies and departments involved, the entire 1942 job will be completed before the end of 1943. The Army and Navy have completed about 15 per cent of the cases under their jurisdiction. The rate of increase is rising rapidly and both departments are confident that all of the thousands of cases which require review of their 1942 earnings will be completed before this year is over.

In the total dollar volume of recovery, only about 25 to 30 per cent represents actual refunds paid through renegotiation of profits. The other 70 to 75 per cent represents savings through price reductions. The emphasis of the entire renegotiation program is on reduction of prices so that the money is not made by the companies in the first place.

There has been no basic change in the methods and procedure used in renegotiation of contracts. The experience the agencies have had with the cases renegotiated so far has brought to light no real need for a change in approach.

One of the most difficult problems posed for renegotiators has been the desire of companies to build up a reserve fund for postwar use, either for reconversion or a fund to maintain employment in the interim period until normal production can be resumed.

Five Methods of Renegotiating

Renegotiators point to five ways in which this can be done within the limits of normal costs. The first of these is the 10 per cent credit being allowed companies on their excess profits tax payments. The second is the standard method of setting up a reserve from profits on which taxes have been paid, such as addition to surplus, or in some other method. The third is the termination clause inserted in virtually all war contracts, which provides for final purchase of finished goods, purchase of semifinished material with a proportionate amount of profit and a provision for the adjustment of inventories. One new angle in this problem is the handling of subcontractors direct by the government rather than prime contractors, which relieves the prime contractor of any contractual obligation for adjustment with his subcontractor at the termination of the war.

The fourth factor is that in many cases the reconversion cost will be considerably lower than the conversion cost in that the equipment being used on war contracts can be used in normal peacetime pursuits after the war. The fifth point is the allowable amount of termination pay.

Renegotiators have ruled that a reasonable amount of termination pay is desirable, and in many cases had been established by companies before war contracts were assumed. This is regarded as a legitimate expense if the period of the termination pay is reasonable. It is also pointed out in this connection that all orders now have provisions for unemployment compensation, which will augment any termination pay and will aid workers in maintaining their families should they be faced with temporary layoffs during reconversion period.

A study of the first companies on which complete figures are available shows that profits after renegotiation are up 9.4 per cent above the base year. About $300,000,000 in profits during the base year for these companies has risen to $330,000,000 after renegotiation for 1942. The handling of excess profits in every case is taken on the excess side rather than the normal side. In other words, renegotiators do not attempt to tell the company how much they should make, but how much they should not make.

Considerable Benefit Has Resulted

In many instances the renegotiation procedure has resulted in considerable benefit to the companies involved. This is primarily on a price basis. In one case, for example, the Maritime Commission was able to show a prime contractor where his costs were out of line with other companies manufacturing similar products and to demonstrate to him how he could reduce these costs and thereby be able to get new government contracts which he could not get on the basis of past performance. In another instance, a study of the cost system of a corporation in connection with renegotiation resulted in a complete analysis of that corporation's cost methods and a considerable saving with resulting increased profit.

On the broad overall picture, many corporations are welcoming renegotiation as an important factor in public relations. This is particularly true of companies selling direct to the public, such as General Motors. Management feels that through renegotiation of its contracts, it can go before the public with a clean slate and with no stigma of having made excessive profits out of the war. This is becoming an increasingly important and popular factor among many companies and may turn out to be one of the most important benefits of the entire renegotiation program.

Brazil's Minerals Bridge Gap In United Nations' Supply Line

SINCE the naval war in the Atlantic and Pacific has almost completely cut off the United States from the mineral resources of the Eastern Hemisphere, the rich mineral deposits of Brazil have become vitally important to the United Nations' war effort. Brazil's mineral exports to the United States doubled in the past few years.

Brazil has become the most important source for such mineral products as iron and manganese ore, mica, quartz crystals, industrial diamonds, and rarer metals, according to Charles Will Wright, chief technical consultant, Metals and Minerals Division, Board of Economic Warfare, Washington, who has made a detailed study of Brazil's potential mineral wealth.[1,2]

Iron ore, urgently needed by Great Britain and the United States, is Brazil's largest mineral reserve, estimated by Brazilian geologists at 15 billion tons. Poor railway facilities limit to about 400,000 tons yearly the export of this high grade ore. Mines at Itabira, 250 miles from Rio de Janeiro, contain an estimated five billion tons of ore and production will be accelerated by the Brazilian government to meet the United Nations' war needs.

To Triple Output

Brazil borrowed $14,000,000 from the Export-Import Bank to equip the Victoria-Minas Railway and the Itabira mine with rolling stock and machinery for an output of 1,500,000 tons a year. Mine facilities will be increased and the railway improved. The project will be completed in 1943. Thousands of additional workers are expected to move into the Rio Doce Valley in coming months to work in the mines.

Mr. Wright points out that for many decades Brazil has been a producer of iron and steel products in small charcoal furnaces. Now there are 14 plants in operation with an output of 180,000 tons of pig iron and 120,000 tons of steel. Brazil is constructing a $45,000,000 steel plant at Volta Redona, in the state of Rio de Janeiro, which will produce 300,000 tons annually. The plant was begun in 1941 and is expected to be in operation in 1944. The Export-Import Bank loaned the Brazilian government $20,000,000 with which to undertake the project.

Next in importance are Brazil's manganese deposits. These are found in the states of Minas Gerais, Matto Grosso, and Bahia. In Matto Grosso, near Corumba, is one of the world's largest undeveloped deposits of high-grade manganese ore. This deposit is estimated to contain from 20,000,000 to 30,000,000 tons. About 2000 tons a month is being exported. Of the total current output from Brazil, two-thirds comes from the Morro da Mina mine of the Cia. Meridional de Mineracao, a subsidiary of the United States Steel Corp. About 20,000 tons are mined each month and reserves at the mine are estimated at a few million tons.

Principal chromite deposits in Brazil are at Campo Formoso and at Santa Luzia, in the State of Bahia. These were worked extensively during World War I, but present output is disappointing, due mainly to lack of good transportation facilities.

Rich Nickel Hoard

The nickel deposit in Sao Jose do Tocantin region, in the state of Goiaz, is considered one of the richest in the world. Ore estimates there indicate many millions of tons, principally garnierite, with an average of over 5 per cent nickel. Overlying this nickel deposit are scattered areas of secondary cobalt ore which were being exploited by the Japanese at the rate of 40 tons of 5 per cent cobalt ore a month.

At Livramento, in Minas Gerais, the Cia. Brazileira de Nickel is mining a garnierite deposit and treating the ore in a 20-ton electric furnace to produce 20 per cent ferronickel at the rate of a ton a day. Another nickel property, Mr. Wright reveals, is at Ipanema, in Espirito Santo, which has been partly drilled, with ore reserves of about 1,600,000 tons of about 2 per cent nickel content.

Larger deposits of copper, lead and zinc are lacking in Brazil. Lead mines at Apiai and Iporanga supply concentrates for the lead smelter at Palmital, in San Paulo, and supplies Brazil with a considerable portion of her lead requirements.

Total bauxite reserves in Brazil are estimated at 20,000,000 tons. Extensive areas have been explored in the States of Minas Gerais and Espirito Santo, the most important being those at Pocos de Caldas in Minas Gerais, with ore reserves of 1,500,000 tons. For some years from 12,000 to 18,000 tons a year of selected bauxite has been exported to Argentina for making aluminum sulfate.

Brazil is now an important source of beryllium. Being a pegmatite mineral, beryl may be found in any of the northeasterly band of states having pegmatite formation but the important commercial production is limited to the states of Paraiba, Rio Grande do Norte, and Ceara. Output this year will be between 2500 and 3500 tons, depending on availability of mining supplies and shipping.

Important production of columbite and tantalite in Brazil was not begun until 1938. Another mineral product from Brazil is monazite sand which contains 25 to 35 per cent cerium, 6 to 8 per cent thorium and other rare metals used in searchlight carbons, radio tube filaments, incandescent gas mantles, etc. Current production is at the rate of about 1400 metric tons yearly.

Rutile Now in Demand

A mineral of growing importance in the armament program is rutile (natural titanium oxide). Production of this mineral began in 1933 in the state of Goiaz, and jumped from 490 tons in 1939 to 2500 tons in 1941.

The demand for industrial diamonds from Brazil has shown a big increase during the past year with exports in 1941 mounting to 235,000 carats.

Nearly 1,000,000 pounds of block mica was exported in 1941, making Brazil the second largest exporter of muscovite mica in the world. Principal mica producing areas of Brazil are in the state of Minas Gerais, the most important districts being Figueira and Espera Feliz. Figueira accounts for about 60 to 70 per cent of the Brazilian output. Brazil's primitive methods for mining mica are being replaced by mechanical equipment. All exportable mica is purchased by the Metals Reserve Co. as a result of a trade agreement with the United States.

Brazil is the only important source

[1] Foreign Minerals Quarterly, July 1941, U. S. Bureau of Mines.

[2] Mining Congress Journal, October 1942, pg. 38-43.

Washing a pan containing industrial diamonds, left. Hydraulic washing is method used on bench deposit at the Mina Serrinha Ltd., Diamantina district. Stripping overburden with bulldozer from pegmatite (beryl) deposit is shown in photo at right

of piezo-electric quartz crystal for use in radio frequency control. A substantial increase in the demand has resulted in marked expansion of the quartz mining industry.

Zircite, or baddeleyite, found in Pocos de Caldas plateau in Minas Gerais, is the only known occurrence of this deposit. These baddeleyite deposits are of particular importance in the war program since the mineral is used in the production of ferro-zirconium and specialized oxide manufacture.

The Magnesite S. A. is exploring high grade deposits of magnesite some 80 miles from the railway station of Jequie in southern Bahia. The reserve is believed to be around 10,000,000 tons and eventually may become an important source of refractory material for the steel plants.

Priority difficulties have retarded efforts to improve the railways and acquire additional rolling stock. Cargo planes are being considered to transport the more important minerals as mica, quartz crystals, and tantalite. Brazil's new mining code dealt a severe blow to foreign capital, thus delaying by many years the development of her mines.

Mr. Wright reports that much interest has been aroused in Brazil because of the strategic importance of her minerals. Through closer co-operation of the Brazilian government and United States officials, engineers and geologists from this country have been sent to develop Brazil's mines. Mr. Wright believes that such developments can be accomplished best by a combination of Brazilian and foreign interests not only in financing but in the technical management.

Due to the fact that Brazil's supply of coal is becoming seriously inadequate, the United States has answered her appeal and sent a group of mining engineers and geologists to study the situation. Further expansion of Brazil's coal fields was studied by a technical industrial commission which has recently returned from Rio.

These projects comprise but a part of the general plan of inter-American economic co-operation.

Steelworkers Use Blast Furnace Slag To Fertilize Victory Gardens

VICTORY gardeners in the Duquesne, Pa., area are not going to be stopped by a shortage of fertilizer. They are using blast furnace slag to condition their soil for planting, the slag being made available by the Duquesne works of the Carnegie-Illinois Steel Corp.

Fifty truckloads of granulated slag were hauled to a 13-acre hillside garden project which is going forward under the joint sponsorship of the city and the company's War Production Drive Committee.

Calcium oxide in the slag is equivalent to 45 per cent lime and serves the same purpose of neutralizing the acid in the soil.

Under a plan worked out between the committee representing the community and the company's War Production Drive Committee, space is available for planting 200 gardens. City engineers have laid out 50-foot garden squares. Several smaller plots in and near Duquesne will be plowed and furrowed for victory garden assignments.

The city and the company are providing the plowing and harrowing, and the company will furnish five tons of fertilizer, to be distributed by the city in 50-pound bags to each gardener. Gardeners will provide their own seeds and tools.

The plant's participation in the Duquesne project is an outgrowth of the company's victory garden program encouraging employes to grow gardens this summer, either in large plots like the one at Duquesne or in their own backyards.

Victory gardening programs in Carnegie-Illinois plants are under the leadership of War Production Drive Committees. Through the committees, how-to-grow-garden charts and booklets have been made available to all employes. In many cases the company has furnished its own available land, has plowed and fertilized it and turned it over to the committees to be used as planting sites for steelworkers and their families.

"No Industrial Pearl Harbor!"

Tremendous resources, plus accumulated purchasing power and adequate preparation can avert peacetime letdown. . . Allied advances heighten interest in problem

AN "Industrial Pearl Harbor" can be avoided if postwar plans are made in time. This was the declaration of Lyman Hill, director of sales research, Servel Inc., Evansville, Ind. before a meeting of industrial executives in New York, May 7, sponsored by the National Industrial Advertisers Association.

That recent allied victories have increased the emphasis on postwar planning was apparent at the meeting.

Mr. Hill admitted planning for the next peacetime era is an "enormous" problem compared with that of after the last war—which cost only 45 billions against an estimated 300 billions for the present conflict.

We have the largest amount of labor in history trained to "think in terms of tolerances of 0.001-inch rather than 1/16-inch," he said. We have tremendous resources. We have a vast accumulation of purchasing power, which will include 23 billions in bonds by year'end.

He said industry should not lean on the Committee for Economic Development in seeking the answers to postwar problems since no single formula can cover every case. Too many companies have the tendency to wander around in circles, he added.

"Thanks to the war, the manufacturer will have available a greater variety of raw and semifinished materials in more abundant quantity than ever before," declared Clyde Williams, director, Battelle Memorial Institute, Columbus, O.

In addition to a greatly increased capacity for producing steel, we will have 1,200,000 tons of aluminum and 300,000 tons of magnesium available on an annual basis, he said. About 1,500,000 tons of copper are available annually from domestic sources, along with about 1,000,000 tons each of lead and zinc. Synthetic rubber, which may be classed as a synthetic resin, will serve as the base for production of a greatly increased amount of structural products. Capacity for the production of basic resins, loosely termed plastics, now is 200,000 tons a year. These resins may be converted into an apparently endless variety of products.

Mr. Williams predicted low-alloy, high strength steels will play an important part in the postwar picture, especially in the transportation field. National Emergency steels, as well as the older automotive steels, also will find increasing applications, he thinks. Lead-coated steel, developed as a result of the scarcity of zinc, should find important uses.

Copper and brass, due to their permanence and workability, will continue to find applications too numerous to list. He pointed out, however, that plastic tubing already is a competitor of copper tubing. The low specific gravity of magnesium will find preferred uses for this metal although it is more difficult to shape and weld than some of the more common metals.

After the war, to achieve a satisfactory level of employment, our economy must provide jobs for 10,000,000 people more than in 1940, William Benton, vice chairman, Committee for Economic Development and vice president, University of Chicago, told the group. Peacetime production must be stepped up 40 per cent. As for the Committee, it believes common good is "best served by an economic system which provides opportunity for the individual. Large corporations would benefit," he added.

Executives Believe Inventory Deflation May Be Avoided

Although many painful adjustments are considered inevitable, most executives consulted by the Division of Industrial Economics, National Industrial Conference Board, in a survey believe a general and disastrous postwar inventory deflation will be avoided.

Two thirds of the companies reporting to the group experienced serious inventory losses following World War I and do not believe events of the last war are a criterion for the future. They consider conservative pricing as the outstanding factor in the present war and protection clauses in many war contracts as factors militating against severe inventory difficulties. About half of the companies anticipate a decline in inventories during the next six months.

Arc Electrode Production Catches Up with Demand

Production of shielded arc electrodes, which has been far below essential requirements during the past year and a half, is increasing steadily and is now slightly in excess of current consumption needs, according to the WPB, General Industrial Equipment Division. March production totaled 96,000,000 pounds, valued at approximately $10,000,000, as compared with 30,000,000 pounds in January, 1942, and 88,000,000 pounds in January, 1943.

The industry's backlog at the end of March represented an average of four months' production at the current rate, a notable improvement over the January backlog of from six months' to a year's production at the January rate.

Peak requirements for arc electrodes, essential in the production of ships, combat tanks, munitions and other vital war items, are estimated at 95,000,000 pounds per month, division officials stated. It is expected that production will continue to increase until June, when a peak production of 110,000,000 pounds, with a dollar value of $100,000 per million pounds, is scheduled to be reached. Plant expansion will be completed and facilities will be fully utilized by that time.

Weatherhead Proposes Plan To Assure Stable Prosperity

A proposal for an economic committee, made up of government appointees from ranks of business and labor, to assure the American people of a stable prosperity and a permanently high standard of living, was made recently by A. J. Weatherhead Jr., president, The Weatherhead Co., Cleveland, before the Chamber of Commerce at St. Thomas, Ont.

The plan would create a revolving fund collected from taxes with the government contributing 60 per cent, industry 30 per cent and labor 10 per cent. Federal portion would be used for public works, industrial portion for plant rehabilitation, and labor portion spread between the two.

WLB Approves Alcoa's Wage Incentive Plan

War Labor Board unanimously approved an incentive wage plan submitted by the Aluminum Co. of America to apply to its Lafayette, Ind., plant. The board made the provision that the plan shall not increase unit labor cost and subjects the plan to periodic review by the Wage Stabilization division.

The incentive plan is expected to result in an overall increase of about 20 per cent for about 2800 of the plant's personnel of 5000, and will accordingly result in a production increase.

Incentive wage plans are permissible in accordance with President Roosevelt's recent "Hold the Line" order, providing they do not increase the level of production costs, the board stated.

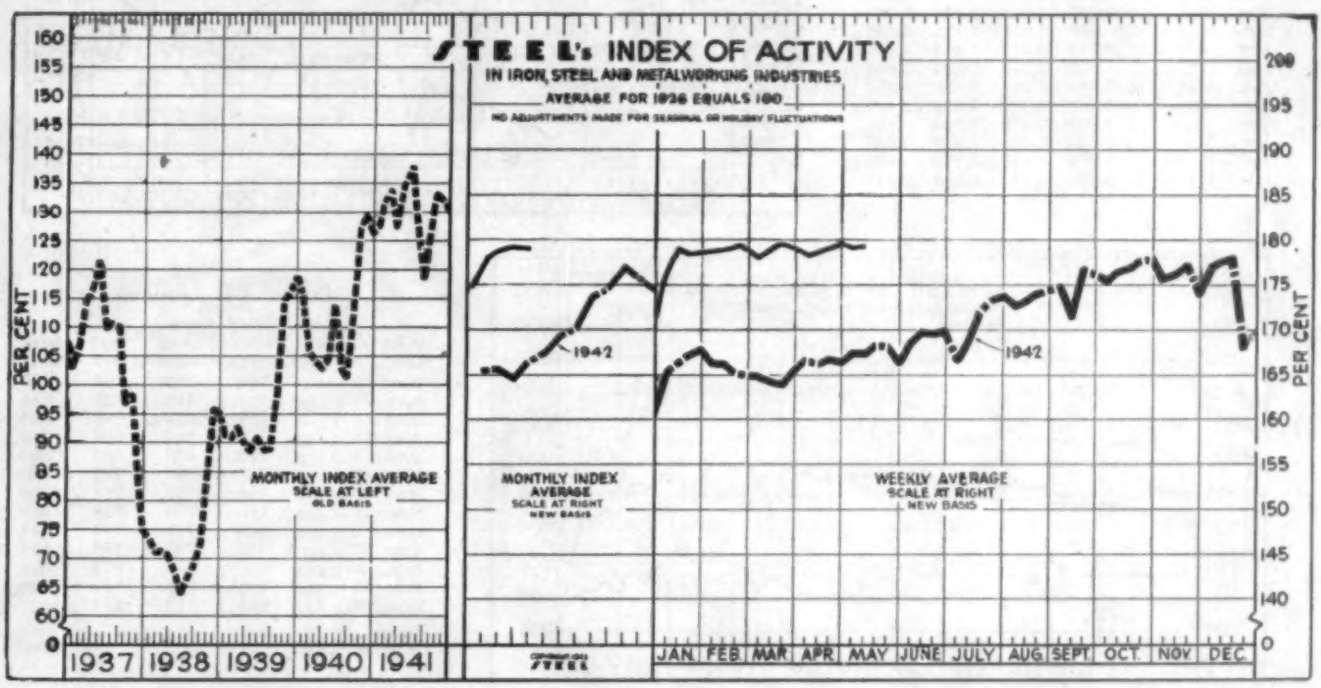
Strike, Furnace Repairs Reduce Coal, Steel Output

RATE of industrial activity was slightly lower in the latest week even though production of finished munitions increased. Sporadic strikes and tighter materials supplies in some basic lines tend to level off the expansion which has continued almost without interruption until recent weeks.

Steel output in the week ended May 8 was at the lowest rate since early February, down one full point to 98.5 per cent of capacity. Currently lower productivity of the industry is a natural concomitant of the severe strain on equipment imposed by war demands. Official sources predict that as high as 10 per cent of the blast furnaces in some districts will go down for major repairs in coming months.

Although the coal strike was a threat to high-level steel operations, it was not a cause of the decline. Its effect on the volume of coal mined was readily apparent. In bituminous fields alone, the abortive mine rebellion cost producers a large proportion of the 380,000-ton decrease reported for the period from April 24 to May 1. Daily average production in that week declined from 1,963,000 tons to about 1,583,000 tons, where the decrease in the comparable week a year ago was only 39,000 tons—in itself a greater than usual recession.

Rise in electric power consumption and preliminary freight carloadings reports raised STEEL's index of activity 0.2 point in the latest seven days to 178.7, which compares with 167.4 at this time a year ago. Electrical energy totaling 3,903,723,000 kilowatt hours was distributed in that week, against 3,866,721,000 kilowatt hours in the preceding period. Gain in output over the like week of 1942 was 16 per cent. Carloadings dropped 5,411 units from the closing week of April to May 1, but reports for the ensuing week indicate this loss will be more than offset by expansion in car use.



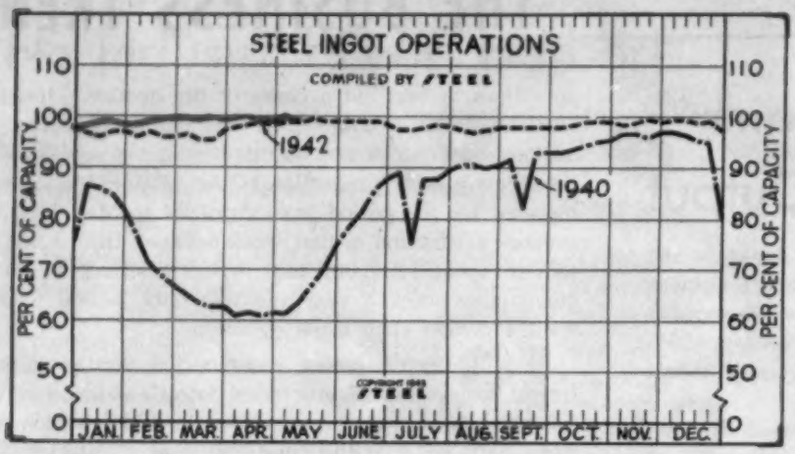
STEEL'S index of activity advanced 0.2 point to 178.7 in the week ending May 8:

Week Ended	1943	1942
May 8	178.7†	167.4
May 1	178.5	167.4
April 24	179.3	166.4
April 17	178.8	166.7
April 10	178.8	166.2
April 3	178.5	166.7
Mar. 27	179.2	165.5
Mar. 20	179.6	163.9
Mar. 13	179.0	164.1
Mar. 6	178.2	164.8
Feb. 27	178.9	165.0

†Preliminary.

Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
Jan.	178.1	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6
Feb.	178.8	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3
March	179.0	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2
April	178.8	166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8
May		167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8
June		169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4
July		171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1
Aug.		173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0
Sept.		174.8	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5
Oct.		176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4
Nov.		175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5
Dec.		174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production



Steel Ingot Operations

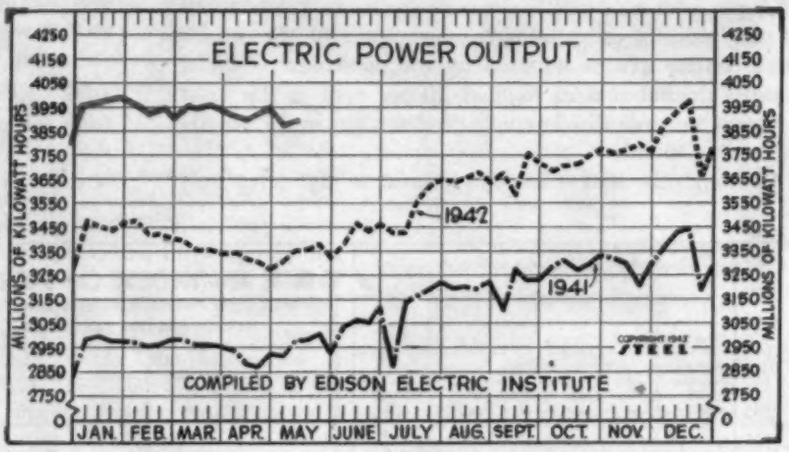
(Per Cent)

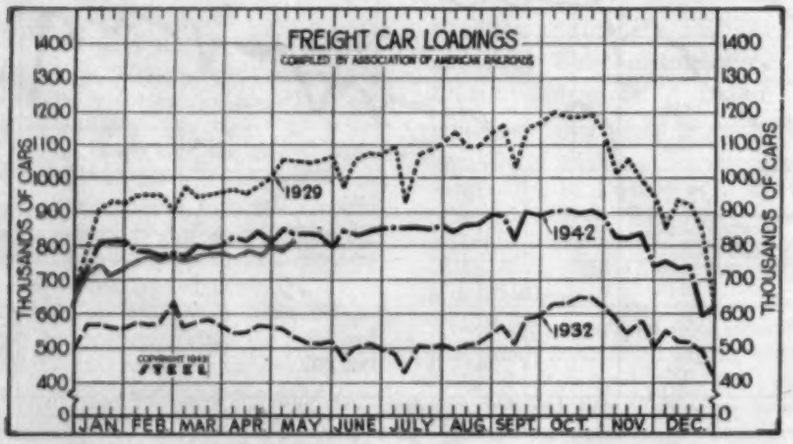
Week ended	1943	1942	1941	1940
May 8	98.5	99.0	97.5	66.5
May 1	99.5	99.0	95.0	63.5
April 24	99.0	98.5	96.0	61.5
April 17	99.0	98.5	98.0	61.5
April 10	99.5	98.5	98.0	61.0
April 3	99.5	98.0	98.0	61.5
Mar. 27	99.0	97.5	99.5	61.0
Mar. 20	99.5	95.5	99.5	62.5
Mar. 13	99.0	95.5	98.5	62.5
Mar. 6	99.5	96.5	97.5	66.5
Feb. 27	99.5	96.0	96.5	65.5
Feb. 20	99.5	96.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0
Feb. 6	98.5	96.0	97.0	71.0
Jan. 30	98.5	97.0	97.0	76.5
Jan. 23	99.0	97.0	95.5	81.5

Electric Power Output

(Million KWH)

Week ended	1943	1942	1941	1940
May 8	3,904	3,351	2,792	2,387
May 1	3,867	3,305	2,734	2,386
April 24	3,925	3,273	2,750	2,398
April 17	3,917	3,308	2,702	2,422
April 10	3,882	3,321	2,721	2,418
April 3	3,890	3,349	2,779	2,381
Mar. 27	3,928	3,345	2,802	2,422
Mar. 20	3,947	3,357	2,809	2,424
Mar. 13	3,945	3,357	2,818	2,460
Mar. 6	3,946	3,392	2,835	2,464
Feb. 27	3,893	3,410	2,825	2,479
Feb. 20	3,949	3,424	2,820	2,455
Feb. 13	3,939	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,523
Jan. 30	3,977	3,468	2,830	2,541
Jan. 23	3,974	3,440	2,980	2,661
Jan. 16	3,952	3,450	2,996	2,674


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1942
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
May 8	801†	839	837	681
May 1	789	859	794	665
April 24	794	816	722	644
April 17	781	847	709	628
April 10	789	814	680	619
April 3	772	829	683	603
Mar. 27	787	805	792	628
Mar. 20	768	797	768	620
Mar. 13	769	799	758	619
Mar. 6	748	771	742	621
Feb. 27	783	781	757	634
Feb. 20	752	775	678	595
Feb. 13	765	783	721	608
Feb. 6	755	784	710	627

†Preliminary.

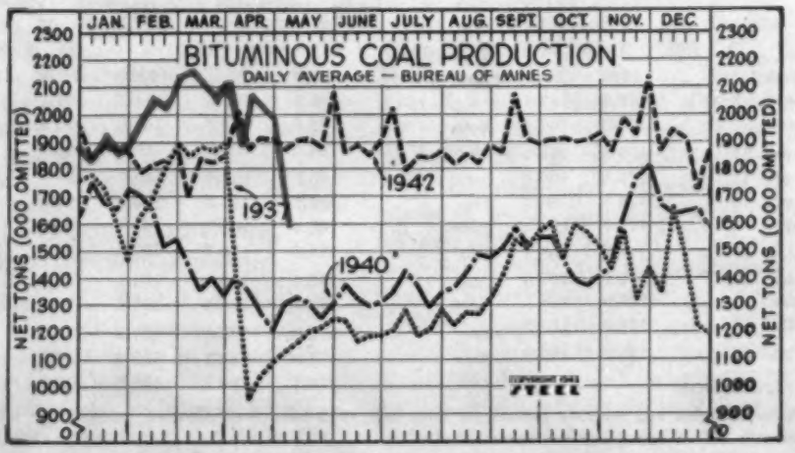
Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

Week ended	1943	1942	1941	1937
May 1	1,583†	1,877	867	1,126
April 24	1,963	1,916	267	1,092
April 17	2,017	1,919	233	1,041
April 10	2,067	1,875	200	953
April 3	1,858	2,019	665	1,381
Mar. 27	2,108	1,858	1,950	1,895
Mar. 20	2,060	1,825	1,879	1,871
Mar. 13	2,100	1,842	1,844	1,883
Mar. 6	2,125	1,693	1,791	1,851
Feb. 27	2,110	1,878	1,736	1,897
Feb. 20	2,027	1,833	1,736	1,807
Feb. 13	2,033	1,817	1,736	1,696
Feb. 6	1,980	1,793	1,683	1,634

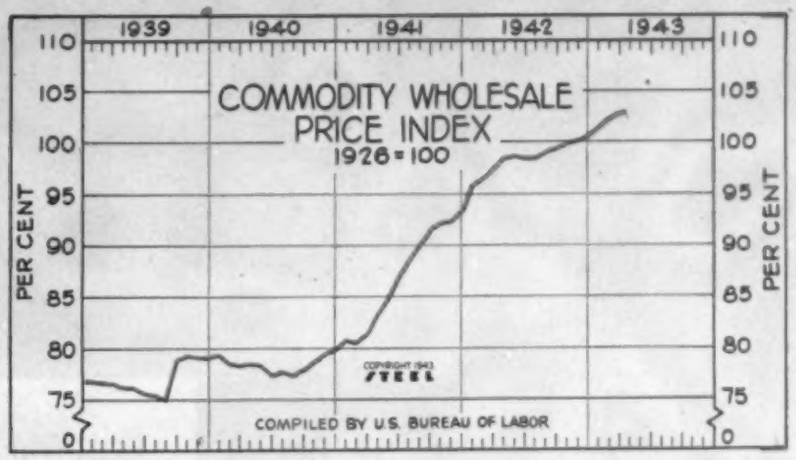
†Preliminary.

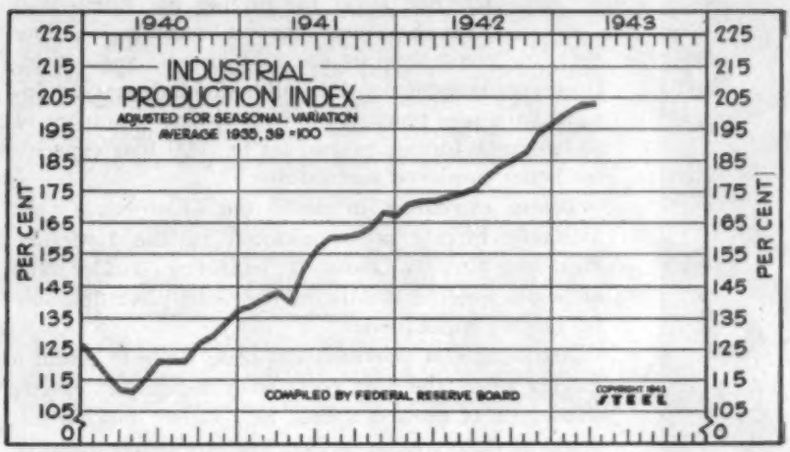

JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
BITUMINOUS COAL PRODUCTION
DAILY AVERAGE — BUREAU OF MINES
NET TONS (000 OMITTED)
1942
1937
1940

All Commodity Wholesale Price Index
U. S. Bureau of Labor

(1926 = 100)

	1943	1942	1941	1940	1939
Jan.	101.9	96.0	80.8	79.4	76.9
Feb.	102.5	96.7	80.6	78.7	76.9
March	103.4	97.6	81.5	78.4	76.7
April	.....	98.7	83.2	78.6	76.2
May	.....	98.8	84.9	78.4	76.2
June	.....	98.6	87.1	77.5	75.6
July	.....	98.6	88.8	77.7	75.4
Aug.	.....	99.2	90.3	77.4	75.0
Sept.	.....	99.6	91.8	78.0	79.1
Oct.	.....	100.0	92.4	78.7	79.4
Nov.	.....	100.3	92.5	79.6	79.2
Dec.	.....	100.7	93.6	80.0	79.2
Ave.	.....	98.7	87.3	78.5	77.1





Industrial Production
Federal Reserve Board's Index

(1935-39 = 100)

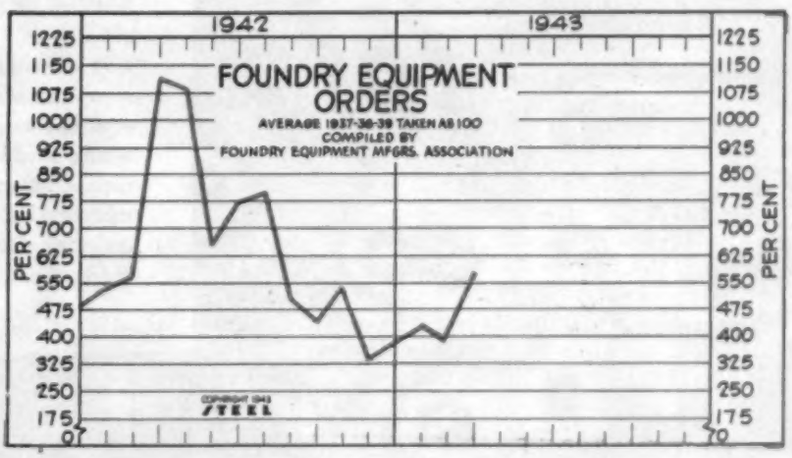
	1943	1942	1941	1940	1939
Jan.	199	171	139	122	102
Feb.	202	172	141	116	101
March	203	172	143	112	101
April	...	173	140	111	97
May	...	174	150	115	97
June	...	176	157	121	102
July	...	180	160	121	104
Aug.	...	183	160	121	104
Sept.	...	185	161	127	118
Oct.	...	189	163	129	121
Nov.	...	194	168	133	124
Dec.	...	197	167	138	126
Year Ave.	...	181	154	122	108

Foundry Equipment Orders

Monthly Average

(1937-38-39 equals 100)

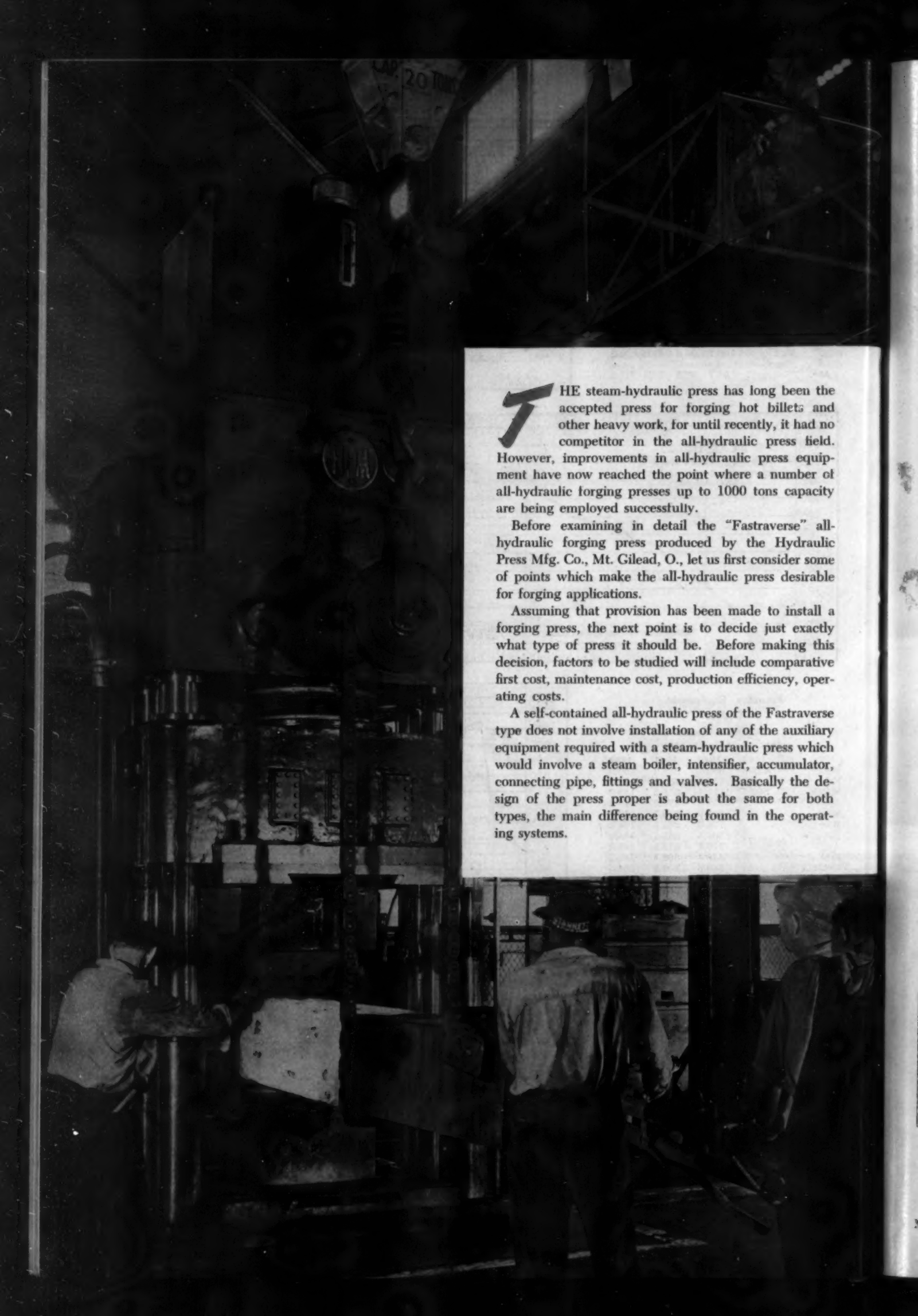
	1943	1942	1941	1940
Jan.	429.8	532.7	285.3	149.0
Feb.	399.5	567.9	281.1	135.7
March	562.7	1122.4	315.2	183.2
April	.....	1033.8	377.2	145.2
May	.....	653.6	298.7	129.1
June	.....	774.0	281.1	164.9
July	.....	800.8	358.1	194.4
Aug.	.....	510.8	312.9	165.4
Sept.	.....	446.4	363.8	161.2
Oct.	.....	540.6	403.8	264.0
Nov.	.....	338.8	408.5	254.2
Dec.	.....	382.5	481.2	257.8
Year	.....	646.7	345.6	184.0



Gear Sales Index

(1928 = 100)

	1943	1942	1941	1940	1939
Jan.	268	288	259	123	91.0
Feb.	303	353	262	116	86.0
Mar.	334	455	288	114	104.0
April	...	378	292	128	88.0
May	...	421	278	133	93.0
June	...	373	299	129	90.0
July	...	344	298	141	89.0
Aug.	...	380	276	191	96.0
Sept.	...	351	245	183	126.0
Oct.	...	263	261	216	141.0
Nov.	...	359	241	173	126.0
Dec.	...	300	243	208	111.0
Ave.	...	355	269.6	155.0	103.0



THE steam-hydraulic press has long been the accepted press for forging hot billets and other heavy work, for until recently, it had no competitor in the all-hydraulic press field. However, improvements in all-hydraulic press equipment have now reached the point where a number of all-hydraulic forging presses up to 1000 tons capacity are being employed successfully.

Before examining in detail the "Fastraverse" all-hydraulic forging press produced by the Hydraulic Press Mfg. Co., Mt. Gilead, O., let us first consider some of points which make the all-hydraulic press desirable for forging applications.

Assuming that provision has been made to install a forging press, the next point is to decide just exactly what type of press it should be. Before making this decision, factors to be studied will include comparative first cost, maintenance cost, production efficiency, operating costs.

A self-contained all-hydraulic press of the Fastraverse type does not involve installation of any of the auxiliary equipment required with a steam-hydraulic press which would involve a steam boiler, intensifier, accumulator, connecting pipe, fittings and valves. Basically the design of the press proper is about the same for both types, the main difference being found in the operating systems.

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia, University Station, Va.
And Contributing Editor, STEEL

All-Hydraulic Press

. . . is now adapted successfully to forging operations

Any comparison of cost must include the cost of the floor space necessary for installation and cost of foundations for the heavy boiler, intensifier and accumulator. With an all-hydraulic self-contained system, the single foundation for the press is sufficient and only that floor space necessary for the press itself is required. The entire power unit is mounted overhead and out of the way as will be seen in the accompanying illustration.

In considering maintenance costs a number of desirable features incorporated in the HPM press are of interest. All the pressure and working parts are lubricated by the operating medium which is a clean, cool, high-grade lubricating oil. Since this oil is cooled and filtered continuously, it has no chance to become loaded with dirt and abrasives, or to lose its lubricating qualities.

The HPM unit largely eliminated the network of piping and valves for it is started, stopped, reversed and its speed changed by varying the pump stroke. No control valves are employed.

In the HPM self-contained system there are no packings to require frequent replacement. The pressure cylinder of the press is smooth bored throughout its entire length and the piston type ram is metallic, piston ring packed. There is no high-pressure packing to deteriorate. The pump which generates pressure for operating the press has no packings, the pump systems being ground and lapped to fit the cylinder bores.

The almost total elimination of piping affords another important saving in maintenance cost. Pumps are mounted close to the pressure chamber, requiring a minimum length of pipe. All corners are turned by bending and all joints are made by welding the pipe into heavy four-bolt flange unions. Thus there is no chance for loose connections and leakage to develop.

Another feature of the self-contained hydraulic system is the almost complete elimination of pressure losses through the pipeline and valves. Also the pressure generator itself is extremely efficient and compact, making highly effective use of power consumed. Too, there are no auxiliary pullback and cylinder assemblies and consequently the entire system is much less complicated. No time lag exists in press operation since there is no intensifier to require recharging.

The entire press operation is controlled from one hand lever. The action is quite rapid, the pressure being closed at good speed by gravity. The closed cylinder is maintained full of oil during the closing movement by a special surge valve which permits high-speed closing. The pressure stroke follows automatically with no appreciable time lag because the pressure cylinder is already full of oil. This permits rapid manipulation of the ram by the operator.

In forging, fast action is a special advantage. Designing an all-hydraulic forging press that closely duplicates the speed and performance of the conventional steam-hydraulic press is one of the most important factors expanding the application of the all-hydraulic press in forging work.

With this compact overall view of the advantages of the HPM self-contained all-hydraulic forging press, let's look at the machine from a designer's standpoint and see how it meets its functional requirements.

Most engineers will probably agree that simplicity is the essence of all good engineering design, and that having the ends to be attained clearly in view is the first requirement for its successful accomplishment. In the case of the all-hydraulic forging press, it is clear that the action should be as fast as the nature of the operation will permit; and the time occupied by the return stroke, together with the nonworking portion of the forward stroke, must be as short as possible.

(*Please turn to Page* 149)

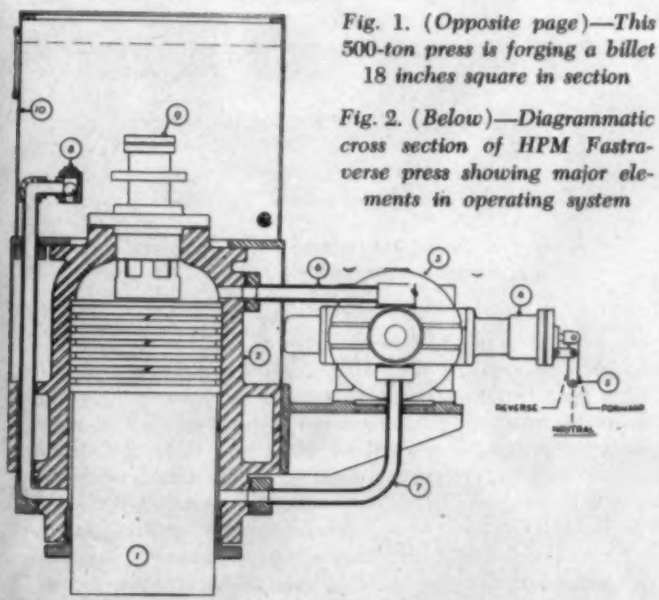


Fig. 1. (Opposite page)—This 500-ton press is forging a billet 18 inches square in section

Fig. 2. (Below)—Diagrammatic cross section of HPM Fastraverse press showing major elements in operating system

Building Ships in— INDIANA

By G. Eldridge Stedman

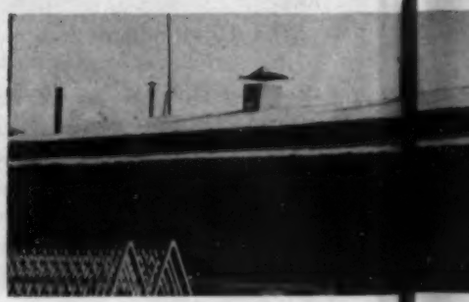


Fig. 1—Typical all-welded ship being launched at Evansville, Ind., shipyard. Ships are moved from building ways to launching basin on unique handling system, then transferred to skids shown here by means of which ships are lowered 67 feet into water

Fig. 2—A few of the several hundred arc welding sets used at the Evansville yard

Fig. 3—Left to right: Frank Harrison, general manager, Missouri Valley Bridge & Iron Co., Shipbuilding Division, Evansville, Ind.; H. S. Tullock, president, Missouri Valley Bridge & Iron Co., Leavenworth, Kan.; Lieutenant Commander F. G. Healy, United States Navy, assistant supervisor of shipbuilding

Fig. 4—Typical job of overhead welding at the Evansville shipyard

Fig. 5—Launching basin under construction. Concrete supports for rails shown in Fig. 1 are here being placed

Fig. 6—Portion of cofferdam that holds out water while launching basin was being constructed

DOWNSTREAM traffic of wooden barges along American inland waterways at one time constituted an important fraction of freight movement.

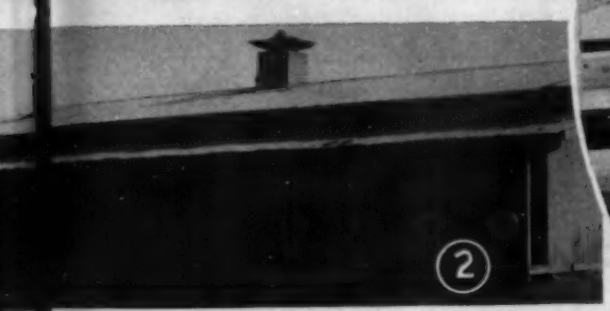
The barges were dismantled after each trip and the materials sold. Railroads and speed, plus the growing shortage of lumber that necessitated return of the "empties", cut into this traffic.

Gradually, slowly, inland waterways became canalized on the Ohio from Cairo to Pittsburgh, and on the upper Mississippi to Minneapolis. Open-channel improvements were accomplished on the lower Mississippi and Missouri. Protected channeling was effected along the Gulf from New Orleans to Houston. These together have provided a 6000 mile water highway which has somewhat generally escaped attention.

Riveted steel barges were substituted for wood in 1912. Redevelopment of waterways thereafter caused river operators to examine transportation costs more closely. Significant improvements in barge and towboat design, particularly in welded steel construction with improved rake ends, roller hatches and liquid carrier construction introduced by the Dravo Corp., Pittsburgh, occasioned yearly acceleration in tonnage handled on these waterways. At war's beginning an amazing freight movement existed along them; coal, sulphur, pipe, fabricated steel, scrap iron, fluorspar, sand and gravel traveled in open barges; general merchandise, tin plate, matches, nails, cotton moved in covered cargo towboats; and petroleum products, vegetable oils, acids, molasses and tar products were transported in liquid carriers.

Welded steel hull construction has done more than merely restimulate this huge waterborne freight tonnage. *It has made possible fabrication, launching and delivery of ocean-going cargo ships and naval auxiliary craft at points far inland along the Ohio and Mississippi, enabling these inland production facilities, materials, supplies and labor to be advantageously utilized in our vital shipbuilding program.*

Welding has made possible the de-



sign and construction of specialized combat ships, evolved from all-welded barge construction. It has permitted standard ship designs to be adapted to some of the methods of mass production. It is a vital factor in engineering our shipbuilding effort to the peculiar transport, amphibian and tank-loading tasks of this multi-fronted global war.

The shipyards of our inland waterways, unusually busy with this variety of naval war production, are indeed testimony to the diversity of location, the ingenuity of our manufacturing methods and the certainty of our abilities to hull out to victory.

On the banks of the Illinois river near Seneca, some 90 miles from Chicago, the Chicago Bridge & Iron Co. recently turned a pasture into a shipyard in eight months. Here a 192-acre shipyard is turning out . . . "the largest ocean-going tank carriers yet devised. They are flat bottomed so they may run up on the beach to land the tanks. Once aground a few levers are pulled, a ramp in the bow drops to the beach and the tanks roar off directly on the fighting terrain, ready for battle, their crews inside" . . . according to the *Chicago Sunday Tribune*, Jan. 24, 1943—which notes that the first of these ships was launched Dec. 13, 1942, just six days after the Missouri Valley Bridge & Iron Co., Shipbuilding Division, had launched the fifth of its kind at Evansville, Ind., first keel having been laid but a few months previously.

In January, 1942, H. S. Tullock, president, Missouri Valley Bridge & Iron Co., and Joseph Shaw, chief engineer of W. A. Bechtel Co., presented various facts to the United States Navy concerning the feasibility of ship construction in the Mississippi Valley area. Action quickly resulted. Evansville was selected as the spot. A group of joint venturers was organized consisting of: the Missouri Valley Bridge & Iron Co., Leavenworth, Kans.; Winston Bros Co., Minneapolis; C. F. Haglin & Sons Inc., Minneapolis; Bechtel-McCone-Parsons Corp., Los Angeles; Sollitt Construction Co., South Bend, Ind. The Missouri Valley Bridge & Iron Co. (Shipbuilding Division) was chosen as sponsor. The venture was launched by a letter of intent dated Feb. 20, 1942.

This group of co-venturers represents organization, facilities and finance to build almost anything, anywhere. In engineering and heavy construction, these separate companies have done many notable jobs including reinforced steel bridges and viaducts, dams, power houses, ocean jetties and harbor works, tunnels, prisons, industrial plants, pumping stations, refineries, irrigation projects, chemical plants. Their contract with the Navy is virtually as agents, on a cost-plus-fixed-fee basis, propelling machinery being provided by the Navy, and working plans of Gibbs & Cox design obtained from Drayo Corp. Otherwise the job is entirely theirs, through many sub-contractors with whom they like to work.

Evansville borders the Ohio river, 189 miles above its entrance into the Mississippi, which is 1000 miles from the Gulf of Mexico. Six dams provide a minimum depth for navigation of 9 feet on the Ohio to the Mississippi. Bridge spans along the Ohio have clearance for larger type oceancraft. For steel shipments, Evansville is equally distant from four main mill points—Pittsburgh, Cleveland, Chicago, St. Louis. In fact there is more potential mill capacity closer to the Evansville shipyard than for any point on the Atlantic seaboard.

TABLE I—Partial List of Equipment at Evansville Shipyard

Description	Size or Capacity	Total Units
Model 200 Colby Cranes	45 Tons at 30'	
Lincoln Arc Welders	400 Ampere	
Lorain Moto-cranes	15 Ton	7
Launching Winches	38,000 lbs. Line Pull	13
Wilson Arc Welders	300 Ampere	
Bucyrus-Erie Cranes	45 Ton	2
Transfer Dollies	100 Ton	30
Mack Truck Tractors	20 Ton	10
Type 80 Osgood Mobilcrane	25 Ton	1
Gardner-Denver Compressors	250 H.P.	2
Welding Panel Boards	Single Panel	
LaCrosse Semi-trailers	19 Ton	10
Steel Scaffolding		40
WA-26 White Trucks	10 Ton	4
Single Drum Winches	15,000 lbs. Line Pull	4
Gardner-Denver Compressor	200 H.P.	1
Chevrolet Flat Bed Trucks	1½ Ton	6
Sterling Truck Tractor	33 Ton	1
Geared Head Lathe	27" x 18'	1
Caterpillar Diesel Grader	12' Blade	1
Reed Prentice Radial Drill	6'	1
LeBlonde Milling Machine	61" x 16"	1

The yard has immense Ohio river frontage within Evansville's corporate limits. There are 32 buildings in the layout, three railroad spurs, necessary building ways feeding into a central transfer area that is fronted by the launching ways. Seldom is a shipyard layout seen in which so much construction can be accomplished in so little space, with such orderly movement from subassembly and with such little waste motion from transportation to storage to job.

Welding, of course, has had a far-reaching influence on shipyard layout. Early shipwelding proved costly because older yards were set up for riveting. I walked all day through the Evansville yard without seeing a rivet. Completely new, this yard is set up entirely for welded construction. All power, gas, water, oxygen and compressed air for the yard is distributed underground, leaving the working area completely free from all service lines. The reinforced concrete slab which makes up the building ways is of such structural strength as to be feasible for erecting hulls in steel cradles, though this is not the present procedure.

The economics of welding in shipbuilding starts with the yard layout itself. Man hours per ton of ship plate tends to remain static in former construction methods while it is declining all the while in welded ship construction. Savings in hull weights, reduced maintenance charges, mass production of ship plates by flame-cutting, speedier fabrication are some of the economies involved. But the fact that the entire yard is more efficient and can be maintained with less invested capital is a basic consideration.

Long, open building ways, extensive erection platforms and cribs, gantry cranes serving two ways at each side; prefabricated work from the platforms and the shipways moving directly to tack-welding and into place—all these represent economies in materials control, manhours, fabricating convenience, progressive assembly of tremendous merit over old shipbuilding methods.

It is always interesting to see evidences that the very old engineers thought out things that have taken us 100 years to appreciate. For example, Eli Whitney in 1818, at Springfield, Mass., as director of United States Arsenals, worked out the jigs, gages, methods and standards by which parts of rifles were made exactly alike and could be used interchangeably. Similarly, and at about the same time, Robert Fulton impelled by difficulties in launching ships on the Hudson, worked out and patented the launching principles used at Evansville shipyards. The system works well, for it gentles these ships sidewards into the Ohio river with nary a ripple.

With the layout of the yard hardly on the board in March, by the end of July a huge steel piling cofferdam had been completed, enabling the construction forces to complete the outboard portion of the launching ways. Because of certain river hazards, this cofferdam has been allowed to remain.

Although details of the launching ways cannot be released, they employ timber skids supported by a series of 26 timber piles. The skids have a slope of 1 foot vertically to 4.75 feet horizontally with a total drop in elevation of about 67

(*Please turn to Page* 142)

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Fig. 1 — Making rockwell hardness tests on a Jominy sample. Roller V-block is being used. Flat anvil may be used if sample is ground flat on two sides 180 degrees apart

By GRESWOLD VAN DYKE
Manager
Special Steel Department
Joseph T. Ryerson & Son Inc.
Chicago

How to use the.....

JOMINY END-QUENCH TEST

WE ARE passing through a period of alloy steel shortage, during which we are unable in many cases to obtain the steels which we have used in the past. This means that many substitutions must be accepted.

Engineering and heat-treating departments are thus called upon to pass on the suitability of many unfamiliar steels for specific applications. An inexpensive, quick and reliable method of determining the heat-treating characteristics of these substitute steels is therefore needed.

The Jominy end-quench hardenability test has been in the hands of research laboratories for some time but has found very little application in the average heat-treating shop.

The Jominy test has the great advantage of being very noncritical. Any high school graduate can be taught to secure accurate results, consistently, after a few hours instruction. It cannot be assumed that this test takes the place of regular laboratory equipment, but it does offer a quick, inexpensive and reasonably accurate method of determining the heat-treatment characteristics of steel and thus is valuable where practical results are a prime requisite and time is an important factor.

From a purely practical standpoint this test has many outstanding advantages. The equipment necessary for making the test consists of a hardening fixture which can be constructed at the cost of a few dollars, a heating furnace, and a rockwell hardness tester. Practically every heat-treating shop has this equipment, except the hardening fixture, Fig. 2. This can be constructed by a tinsmith and a pipe fitter at a cost which should not exceed about $25.

The sample consists of a machined piece of 4-inches overall length. It is 1-inch round for a distance of 3⅞ inches and has a flange approximately 1⅛-inch in diameter and ⅛-inch thick on one end.

The operation of the test is very simple. The sample is heated to the proper quenching temperature for the steel tested, it is placed in the fixture, after which the sample may be quenched all over in water. The next operation is to grind a flat along the entire length of the sample about 0.015-inch deep to remove decarburized surface. Rockwell C hardness readings are taken, starting at the hardened end at 1/16 intervals for a distance of about 2 inches.

The quenching water jet impinges on the end of the sample and this area is cooled very rapidly. Inasmuch as the heat must travel by conduction from the sample to the quenched end, the top portion of the sample will cool very slowly. Different rates of cooling therefore occur all along the sample. The behavior of the steel at the different rates of cooling is indicated by

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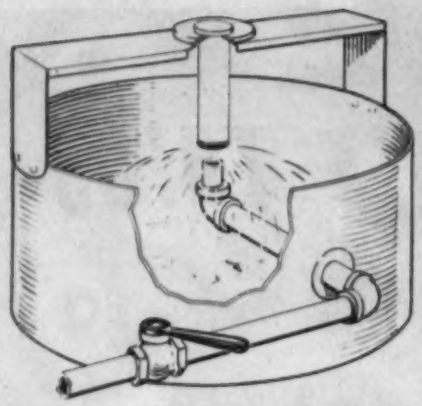

Fig. 2—Jominy hardenability test fixture. Unit should be mounted close to furnace so sample can be transferred to quench quickly. Fixture bowl should be at least 14 inches in diameter to avoid side splash

the different rockwell hardness readings.

Research laboratory experiment has determined just how rapidly the sample cools at different distances from the quenched end. These rates of cooling are listed in Table II.

Table III indicates the rate of cooling of round bars from 1 to 4 inches in diameter, at the surface, half radius and center, for both oil and water quenching.

Assuming that the hardness developed in any particular steel by quenching is a function of the rate of cooling, then we can predict the hardness of quenched bars of different sizes from the Jominy rockwell reading.

Example: A 3-inch round bar when quenched in oil will cool at 30 degrees Fahr. per second on the surface. (See Table III) The Jominy sample cools at 30 degrees Fahr. per second at a distance of ½ inch from the quenched end. The hardness therefore developed at ½ inch from the quenched end of the Jominy sample will be approximately the same as the hardness developed by oil quenching a 3-inch round bar of the same steel if the reading is taken on the surface.

The same 3-inch round bar will cool at 12 degrees per second at the half radius point, if quenched in oil. (See Table III.) This rate of cooling corresponds to the rate at a point about 15/16-inch from the quenched end of the Jominy sample. Therefore the hardness of the oil-quenched 3-inch round bar at half radius will be approximately equivalent to the hardness shown on the Jominy sample at 15/16-inch from the quenched end.

Long time experiments have indicated that the quenched hardness of steel containing in excess of about 0.35 per cent carbon and between 200 and

TABLE I—Jominy Test Check

The following compares actual physical properties with properties predicted by interpretating results of the Jominy tests. Note extremely close comparison resulting, discrepancies being well within the limits of variations expected in ordinary laboratory practice on different samples from the same heat of steel.

Steel Sample Location Condition	Rock. C on Jominy Specimen	Tensile Strength psi.	Yield Point psi.	% Elong. in 2"	% Red. of Area
STEEL 1—1" Rd.—Center					
800 F. draw—Actual		138,000	122,250	16.4	53
800 F. draw—Interp.	30	148,000	130,000	19.0	54
1000 F. draw—Actual		122,250	101,750	20.3	56.2
1000 F. draw—Interp.	23	123,000	106,000	23.0	61.0
1200 F. draw—Actual		106,350	84,925	23.0	63.6
1200 F. draw—Interp.	18	109,000	91,000	24.0	62
STEEL 2—1" Rd.—Center					
800 F. draw—Actual		212,750	168,525	13.3	45.1
800 F. draw—Interp.	42	204,000	180,000	13	45
1200 F. draw—Actual		132,750	118,325	22.6	61.2
1200 F. draw—Interp.	25	128,000	109,000	22	59
STEEL 3—1" Rd.—Center					
800 F. draw—Actual		200,570	175,475	13.3	43.7
800 F. draw—Interp.	39	188,000	168,000	14	44
1000 F. draw—Actual		169,625	142,500	16.4	48.2
1000 F. draw—Interp.	33	162,000	140,000	17	50
1200 F. draw—Actual		127,325	109,450	25	61.7
1200 F. draw—Interp.	21	118,000	95,000	24	62
STEEL 4—1" Rd.—Center					
800 F. draw—Actual		217,750	175,400	13.3	42
800 F. draw—Interp.	42	204,000	180,000	13	45
1200 F. draw—Actual		130,100	111,250	24.3	63.1
1200 F. draw—Interp.	21	124,000	95,000	24	62
STEEL 5—1" Rd.—Center					
800 F. draw—Actual		196,075	179,800	13.3	44.9
800 F. draw—Interp.	41	192,000	175,000	13	45
1000 F. draw—Actual		165,925	145,875	17.2	48.4
1000 F. draw—Interp.	36	170,000	153,000	17	49
1200 F. draw—Actual		125,175	105,475	23.5	61
1200 F. draw—Interp.	24	125,000	107,000	22	59
STEEL 6—1" Rd.—Center					
800 F. draw—Actual		203,200	185,450	12.1	42
800 F. draw—Interp.	38	189,000	158,000	15	46
1000 F. draw—Actual		165,850	150,000	16	48.4
1000 F. draw—Interp.	34	162,000	142,000	18	51
1200 F. draw—Actual		120,500	104,600	22.7	61.6
1200 F. draw—Interp.	21	114,000	95,000	24	62
STEEL 7—1" Rd.—Center					
800 F. draw—Actual		210,700	186,650	12.9	44.2
800 F. draw—Interp.	41	198,000	175,000	13	45
1000 F. draw—Actual		176,000	164,075	15.2	45.9
1000 F. draw—Interp.	34	168,000	142,000	18	51
1200 F. draw—Actual		133,800	118,975	22.7	55.8
1200 F. draw—Interp.	23	129,000	106,000	23	61
STEEL 8—1" Rd.—Center					
800 F. draw—Actual		232,475	196,075	8.5	32.1
800 F. draw—Interp.	46	222,000	181,000	12	42
1000 F. draw—Actual		170,125	150,950	14.8	46.5
1000 F. draw—Interp.	35	165,000	143,000	17	51
1200 F. draw—Actual		134,125	118,000	20.7	57
1200 F. draw—Interp.	27	135,000	116,000	21	57
STEEL 9—1" Rd.—Center					
800 F. draw—Actual		203,675	184,950	13.7	45.1
800 F. draw—Interp.	41	192,000	175,000	13	45
1000 F. draw—Actual		160,225	144,725	17.2	48.9
1000 F. draw—Interp.	32	158,000	133,000	19	54
1200 F. draw—Actual		131,750	117,375	23.1	59.8
1200 F. draw—Interp.	22	128,000	100,000	25	63
STEEL 9—3½" Rd.—½ Radius					
800 F. draw—Actual		154,475	130,450	16	42.2
800 F. draw—Interp.	31	150,000	132,000	19	54
1000 F. draw—Actual		132,625	110,825	19.2	48.3
1000 F. draw—Interp.	24	128,000	107,000	22	59
1200 F. draw—Actual		117,150	85,425	24.6	58.6
1200 F. draw—Interp.	18	109,000	90,000	24	64
STEEL 10—1" Rd.—Center					
800 F. draw—Actual		205,750	192,750	11.3	31.6
800 F. draw—Interp.	44	206,000	178,000	13	43
1000 F. draw—Actual		169,375	149,500	15.2	41.8
1000 F. draw—Interp.	37	175,000	154,000	16	49
1200 F. draw—Actual		130,875	113,700	22.7	57.2
1200 F. draw—Interp.	28	137,000	120,000	21	57
STEEL 11—1" Rd.—Center					
800 F. draw—Actual		213,825	197,250	10.2	29.3
800 F. draw—Interp.	42	204,000	180,000	13	45
1000 F. draw—Actual		165,575	153,175	14.4	40.5
1000 F. draw—Interp.	34	162,000	142,000	18	52
1200 F. draw—Actual		129,875	115,850	21.9	55.9
1200 F. draw—Interp.	25	128,000	109,000	22	60
STEEL 12—1" Rd.—Center					
800 F. draw—Actual		223,100	180,650	10.9	38.5
800 F. draw—Interp.	44	206,000	178,000	13	43
1000 F. draw—Actual		166,625	148,825	15.6	46.8
1000 F. draw—Interp.	35	165,000	145,000	16	52
1200 F. draw—Actual		132,250	115,125	21.9	59.9
1200 F. draw—Interp.	26	130,000	118,000	21	58
STEEL 12—3½" Rd.—½ Radius					
800 F. draw—Actual		174,500	134,725	12.9	37.7
800 F. draw—Interp.	36	168,000	145,000	17	49
1000 F. draw—Actual		146,875	118,575	17.9	45.6
1000 F. draw—Interp.	30	150,000	128,000	19	54
1200 F. draw—Actual		118,875	88,550	23	56.6
1200 F. draw—Interp.	22	118,000	100,000	25	63
Average of All Physicals —Actual		161,180	137,700	17.3	49.5
—Interp.		158,100	135,500	18.3	52.5

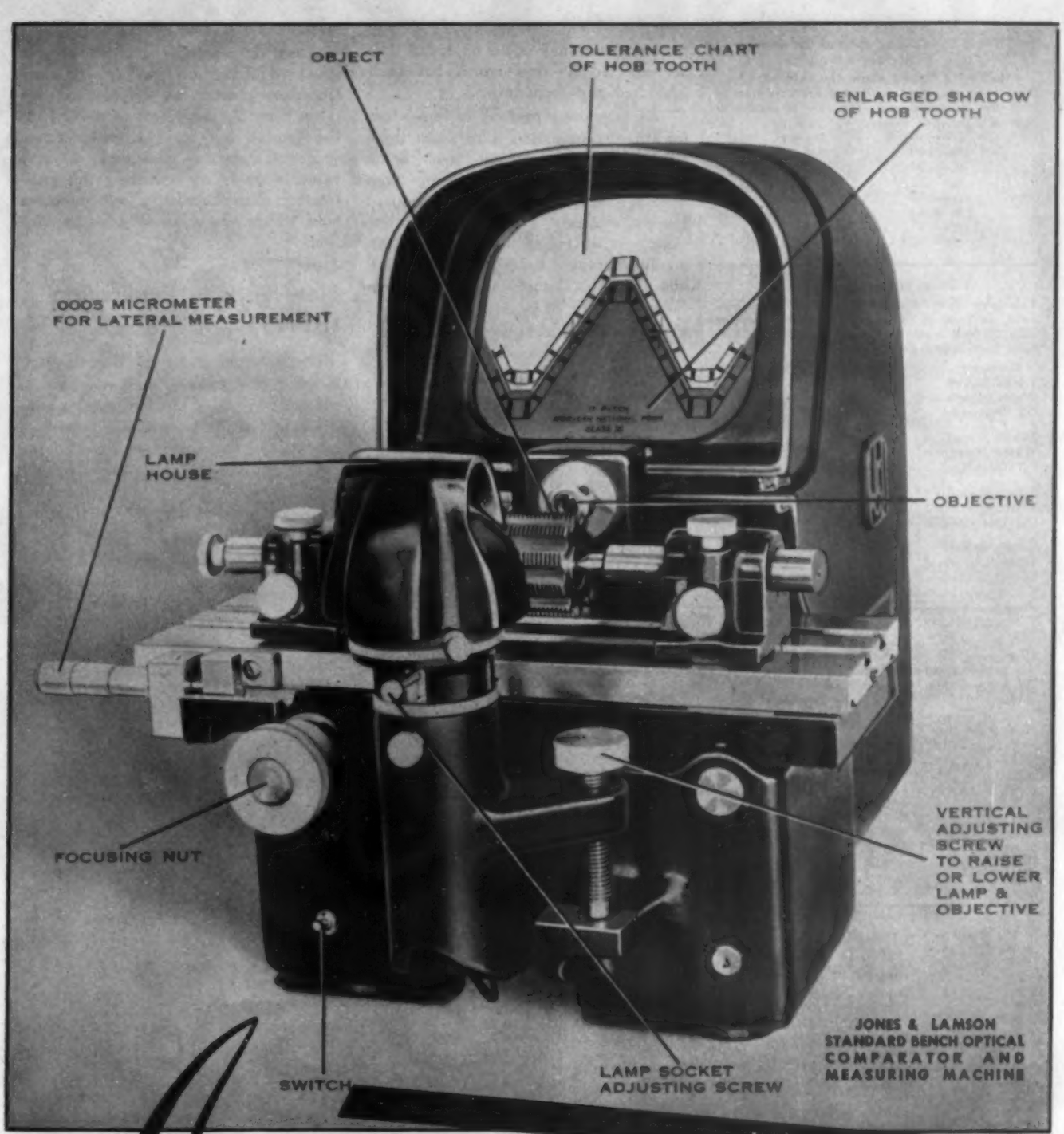
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TABLE II—Cooling Rate of the Jominy Test Specimen

The following figures show the rate at which the Jominy specimen cools at different distances from the quenched end. The rate is shown in degrees Fahr. per second.

1/16—600	5/8—26
1/8—190	3/4—22
3/16— 99	7/8—18
1/4— 72	1 —14
5/16— 56	1 1/8—10
3/8— 44	1 1/4— 8.5
7/16— 37	1 3/8— 7.2
1/2— 30	1 1/2— 5.5

TABLE III—Cooling Rates

This table shows the rate of cooling in degrees Fahr. per second of various diameter bars for both oil and water quenching and at the surface, half radius and center.

Diameter	Surface	1/2 Radius	Center
1-inch Round			
Water Quenched	850	135	100
Oil Quenched	120	53	45
2-inch Round			
Water Quenched	550	46	32
Oil Quenched	58	24	18
3-inch Round			
Water Quenched	400	27	15
Oil Quenched	30	12	9
4-inch Round			
Water Quenched	100	14	8
Oil Quenched	15	6 1/2	5 1/2

desirable to endeavor to use the Jominy test to determine what physicals may be expected in steel which has been quenched and then drawn.

The suggested method of procedure for this determination is to make three Jominy samples of the steel being tested. The three samples are then heated and quenched by the standard Jominy method. After quenching one sample is drawn at 800 degrees Fahr. another sample at 1000 degrees Fahr. and the third sample at 1200 degrees Fahr.

After cooling the three samples are then ground and rockwell tests run in the usual manner.

The rockwell hardnesses developed on the three samples are then interpreted by the use of Tables I, II, III and IV and the results will form a valuable guide in predicting the subsequent heat treatment behavior of the steel which is being tested.

Table I indicates in detail the results of the quenched and drawn Jominy

TABLE IV—Physical Property Correlation

Conversion of Jominy rockwell hardness values to other physical properties. Physical properties for hardness values other than those listed between 15 and 42 rockwell C can be approximated by interpolation. Thus tensile for 22 rockwell C would be 112,000 to 125,000 pounds per square inch.

Rockwell C	Brinell Hardness	Tensile Strength psi.	Yield Point psi.	Per Cent Elong. in 2"	Per Cent Red. of Area
15	200	95,000-105,000	70,000- 80,000	22-28	60-68
20	225	100,000-119,000	87,000-100,000	21-26	75-65
24	250	118,000-132,000	102,000-112,000	20-25	55-63
28	275	130,000-145,000	115,000-125,000	18-23	52-61
31	300	142,000-158,000	127,000-135,000	17-21	50-58
34	325	153,000-172,000	137,000-146,000	16-20	47-56
37	350	165,000-185,000	150,000-159,000	14-18	45-54
39	375	176,000-200,000	163,000-172,000	13-16	42-51
42	400	187,000-221,000	175,000-184,000	11-15	40-49

TABLE V—Analysis of Steels Used in Tests Results of Which Are Listed in Table I

Steel No.	C.	Mn.	P.	S.	Si.	Ni.	Cr.	Mo.
1	0.29	.66	.02	.082	.21	...	.53	.32
2	0.46	.93	.029	.027	.28	.47	.59	.26
3	0.42	1.05	.016	.027	.47	.31	.31	.13
4	0.45	1.24	.021	.026	.55	.63	.53	.12
5	0.44	1.20	.017	.028	.43	.40	.38	.11
6	0.42	1.16	.008	.032	.57	.32	.27	.13
7	0.44	1.37	.043	.030	.54	.33	.44	.14
8	0.48	1.22	.018	.028	.47	.40	.32	.12
9	0.47	1.16	.017	.026	.52	.32	.31	.14
10	0.46	1.04	.024	.034	.50	.40	.33	.10
11	0.48	1.28	.022	.036	.41	.29	.35	.10
12	0.46	1.23	.025	.026	.48	.33	.29	.12

400 brinell bears a definite relationship to its tensile strength and other physical properties. Table III shows rockwell hardness and the approximate corresponding brinell hardness and physical properties expected.

The data in Table IV does not apply to steels in the annealed, normalized condition, or "as rolled" condition, but is reasonably reliable when used under the conditions already mentioned.

The physical properties obtained by the above methods of Jominy interpretation are those which can be expected in the *as-quenched* condition only. Most alloy steels are used in a quenched and drawn condition and therefore it seems tests on the 12 different heats of steel listed in Table V. In order to check the reliability of this method, samples of each heat were put through the quenched and drawn Jominy test and interpretations were made. These results are compared with standard quenched and drawn pull tests on the same steels and are tabulated side by side in Table I. It is interesting to note that the *average* of these 40 tests show a discrepancy of only 3080 pounds per square inch in tensile strength, 2200 pounds per square inch yield strength, 1 per cent in elongation and 3 per cent in reduction of area.

These discrepancies are no greater than would be expected in ordinary laboratory practice on different samples taken from the same heat of steel. Thus the Jominy test and its interpretation suggested should constitute a very valuable guide in estimating the heat-treating characteristics of any unknown steel which was being used for the first time.

New Battelle Publication List Now Available

One-hundred and forty Battelle-originated books, patents, and journal contributions are listed in a new catalog published by Battelle Memorial Institute, Columbus, O. The catalog, in booklet form, covers publications and patents for the years 1941-1942 and supplements a previous listing of over 500 publications and patents of prior date.

Since its beginning, Battelle has utilized the media of the various technical and scientific journals in disseminating the results of its research in chemistry, metallurgy, fuels, and ceramics. The new catalogue lists all the contributions to the technological literature made by Battelle staff members during 1941 and 1942.

Copies of the new catalogue and the prior listing which it supplements are available upon request.

Venting of Mine Gases Lowers Ventilating Costs

Pipe holes from 100 to 1000 feet deep are being drilled by mining interests near the Bluefield, W. Va. district in order to free dangerous gas from coal mines before the seam is worked the Compressed Air Institute, Cleveland, reports. Not only is the gas released but definite economy in ventilation costs is realized, it is said.

In venting the gas, pipes are sent a short distance through the collar of the holes and then connected to blowers which provide the exhausting action.

Some of the mines where this is being done, the institute reports, are extremely gassy. One liberates as much as 12,000,000 cubic feet of gas per day—enough to supply a large city.

Although amount of inflammable methane must be kept to a maximum of 0.5 per cent in the mine atmosphere, it is the aim of this new gas-evacuating process to reduce the amount of methane in the mine atmosphere 50 per cent before a coal seam is opened.

According to the institute, to exhaust 12,000,000 cubic feet of gas by usual means would require the circulation of 300,000,000 cubic feet of air per minute.

What's Behind the Trade Mark?

QUALITY
TRADE MARK
YOUNGSTOWN
SERVICE

Faith in the Future

The Youngstown Sheet and Tube Company was founded in November, 1900 by 47 local investors, with an authorized capitalization of $600,000. In December, 1901, this capitalization had been increased to $4,000,000 to provide for the expanded program decided upon by the men of vision who planned the future of this company.

In February, 1902, 14 months after the initial meeting of the shareholders of this company, the first product carrying the Youngstown trademark was produced. In this same year, these pioneers took the first step to assure complete integration . . . the first producing blast furnace was purchased... the first ore properties were acquired... and the first coal lands obtained. These early acquisitions all served as a nucleus around which was created the great industrial organization, which in later years served mankind in every corner of the globe where products of civilization were making life more complete.

We are doubly appreciative of the efforts of those who preceded us at Youngstown. These men of faith, courage, foresight and action have bequeathed to us those things with which we can make a definite contribution in helping to win freedom for the world today, and upon which we can help build an assured prosperity for the future.

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Plates - Conduit - Bars - Tin Plate
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Spikes - Alloy and Yoloy Steels

The YOUNGSTOWN
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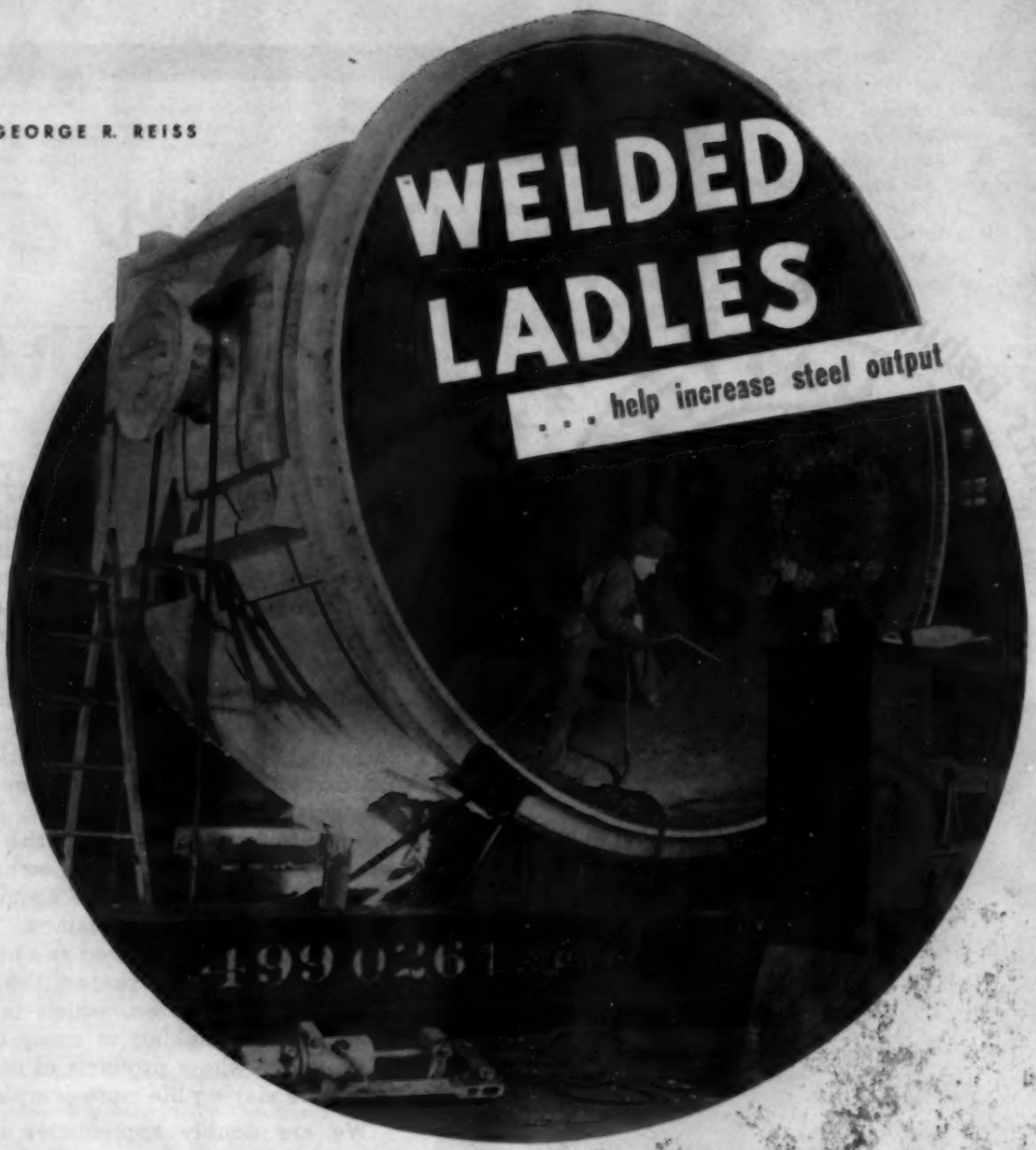
Manufacturers of
CARBON · ALLOY AND YOLOY STEELS

By GEORGE R. REISS

WELDED LADLES

. . . help increase steel output



Putting the finishing touches on one of the world's largest open-hearth ladles—a 225-ton unit—shown here being prepared for shipment on a special rail car

SOME FEW years ago, a representative of an American steel plant approached officials of the William B. Pollock Co., Youngstown, O., a prominent maker of blast furnaces and steel plant equipment, with the appeal:

"Can't you do something about your open-hearth ladles—something about cutting down their weight?"

That simple little appeal was one of the greatest factors in enabling scores of war-rushed American open-hearth shops to boost their steel output sharply at comparatively little cost, and without extensive and expensive rebuilding of their plants and overhead crane systems. It was a really important aid in raising American steel producing capacity.

It seems that this particular steel producer wanted to increase the sizes of his open-hearth heats. It could do it easily enough—but there was one "catch". It was not possible to merely substitute larger ladles to handle these larger heats—for the plant had reached the limits of the capacity of its overhead crane system. Ladle loads were already as heavy as the cranes could handle. Heavier ladles with larger loads of steel would seriously overload the cranes. Of course, the plant and cranes could have been rebuilt—at considerable cost—but there was a business depression, and that building would be expensive. So it sought another alternative.

"We'll see what we can do," promised a Pollock executive after hearing the story. So their engineers set to work.

Heretofore, open-hearth ladles had usually been made of riveted steel plates combined with castings. That construction made the ladle big, clumsy, heavy and expensive.

The crane loading exerted by an open-hearth ladle of a molten steel is the sum of three weights—the deadweight of the ladle shell itself, the deadweight of the lining and the live weight of the load of molten steel. To increase the amount of molten steel carried in the ladle means reducing the weight of the ladle shell itself, since the lining's weight cannot be reduced safely.

"Why not," suggested one engineer, "make it from welded steel plates—and save all that weight?" Scoffers insisted the idea wouldn't work—but the Pollock company went ahead and tried it anyway. And it did work—reducing the weight of the first ladle by about one-third. That meant that the ladle would hold just that much more steel, *without increasing the total load on the cranes.* So it solved that particular steel producer's problem.

Other companies, seeking to enlarge their open-hearth capacity with minimum expenditures, tried the welded type ladle cautiously—very cautiously, and they found it solved their problems, too. The result has been that in many open-

WHAT HAPPENED TO THE 4999th?

A TINY FLAW, a jammed gun, a boy's life's blood reddens the earth, out there in that leaden hail. Had someone blundered when the parts for that gun were made?

Five thousand parts make up that gun of his. Five thousand pieces of metal—yet only a single one need fail to cost his life so bravely given. Your neighbor's son or yours. Think now, what tremendous liability to tiny bits of metal!

What can *we* give? Only the patient work that moulds and toughens fit metal for his fighting. Only the craftsmanship that forms each part with absolute precision. Only our sweat to save his life, our toil to help him toward Victory.

This we can do. Metal is sacred—save it! This we can pledge. Each part, however small, shall move in the terrible motion of battle—true, sound and as nearly perfect as human skill and mechanical ingenuity can make it.

Such resolve controls the quality of each Empire bolt and nut—each bit of metal on which a soldier's destiny may ride. To manufacturing processes which insure maximum strength and greatest accuracy, we add the personal energy and care so essential to Victory.

Free posters for your plant's bulletin boards, reproducing this ad with an appropriate slogan in place of our signature, are available upon request. Write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W *Making strong the things that make America strong*

"CLETRAC" PARTS HARDENED BY TOCCO

SAE 1045 Steel
Surface-Hardened to 60-62 R.C.

Part	Production Per Hour
Sprocket	15
Track Pin (Small)	550
Track Pin (Large)	400
Bracket Plunger	100
Shift Shaft	150
Ring Gear	60
Lock Pawl	120
Pivot Shaft	100
Link Pin	100
Rocker Arm Shaft	100

TOCCO TRIPLES OUTPUT OF 10 "CLETRAC" PARTS

THE Cleveland Tractor Company, manufacturer of well-known "Cletrac" military, industrial and farm tractors, cites these benefits of hardening parts with a 100 KW "TOCCO Jr.":

Greater Output. Average production speed now three times that of former hardening methods. Elimination of carburizing has cut hardening cycles on most parts from 8 hours to a few seconds.

Versatile. 10 widely different "Cletrac" parts—from 28" sprockets to ¼" link pins are hardened on one "TOCCO Jr." New applications being developed continually with the aid of TOCCO engineers.

Lower Costs. Cuts man-hours. Eliminates expensive plating, carburizing and straightening operations. Replaces scarce alloys with carbon steels. Simple to operate, doesn't require skilled operators.

"TOCCO Jr." equipment is built for continuous production service. Dependable, rugged motor-generator supplies power at a safe, low voltage.

Find out how TOCCO can improve your war production and enable you *to cut costs and improve your products for postwar markets.*

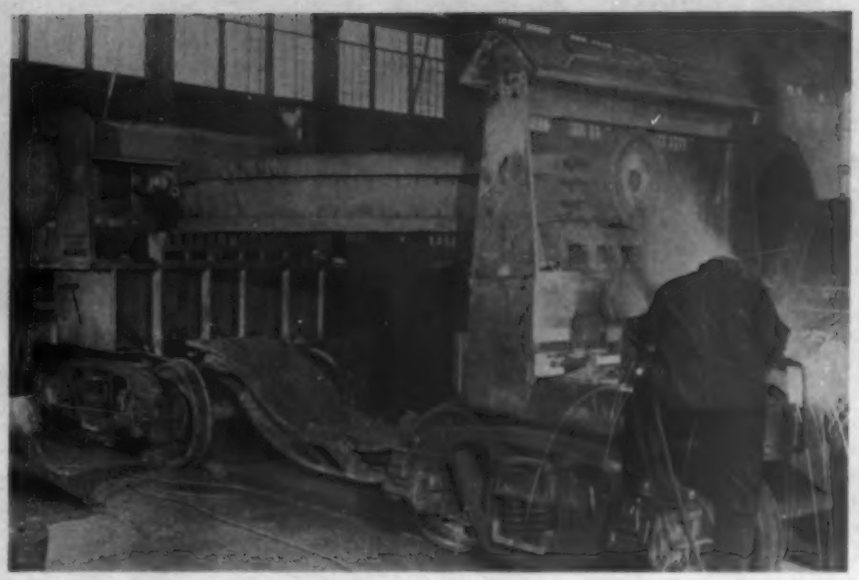
THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio

TOCCO

World's Fastest, Most Accurate Heat-Treating Process

HARDENING
ANNEALING
BRAZING
HEATING for forming and forging

Hot metal car being fabricated by welding. Racks and gear permit ladle to be tilted for pouring



hearth plants all the ladles are now of welded steel. New plants are specifying them exclusively.

Currently, the Pollock company is using welded construction in fabrication of 23 of the world's largest open-hearth ladles, monster kettles which hold 225 net tons of steel each. These giants weigh about 40 tons empty, stand 13½ feet high and 13½ feet in diameter. Carnegie-Illinois Steel Corp.'s new open-hearth plant at Braddock, Pa., will take 12 of them, and 11 others are for the Columbia Iron & Steel Co.'s new steel plant at Provo, Utah.

And these welded ladles possess other advantages beside lightness, Pollock executives claim. These advantages include a smoother inside surface which makes it easier to lay up the firebrick linings, and the smoother, better appearing outside surfaces that makes it easier to keep clean. The lining can be laid directly against the sides of the welded ladle without the backing course between the bricks and shell that is required for riveted ladles to cover rivet heads, butt straps and other projections.

The Pollock company has found various steel plants specify different thicknesses of lining, depending on their own experiences. Most steel plants prefer from 9 to 11 inches on the bottom, 9 inches of lining on the bottom sides of the walls, with about 7 inches at the top.

The Pollock company holds various patents on the welded ladle, some covering general methods of design, others covering certain construction details.

There is no great saving in weight in building smaller ladles by the welding method. Those under 50 to 60-tons weigh about the same in either type of construction. Many smaller ladles, such as blast-furnace hot-metal ladles, transfer ladles and electric-furnace ladles are still built by the riveted plate method. However, many plants are specifying welded construction even for these types.

The preferred design for open-hearth ladles is a round shape with the height slightly greater than the diameter of the vessel, up to a height of 11 or 12 feet. In larger vessels, the height is kept at 11 to 12 feet, and only the diameter increased. This is done to keep down the head of metal while pouring.

In some open-hearth plants, problems of overhead clearances because of crane dimensions make it necessary to design specially shaped ladles. The company has built some elliptical shaped ladles. Some are even rectangular in shape because of the limited height, width and length possible.

Methods used in the big Youngstown plant of the William B. Pollock Co. are quite conventional. Ordinary low-carbon steel plate is used in constructing the shells of the welded ladles, since that appears to be the most economical and safest material available, although steel engineers frequently have suggested use of high-strength alloy steel to bring about further reductions in weight. However, the saving in weight in use of these high-strength steels is usually insufficient to justify the additional cost, the special precautions which must be used in fabricating them and other factors such as the sensitiveness of these steels to the sudden changes in temperature that occur when hot metal or hot slag is spilled over the sides.

Fabrication of the welded ladles begins with the steel plates which are laid out and cut to size by conventional methods. Then they are pressed or rolled to the exact shape they will take in the ladle on huge rolling presses.

Next the parts are fitted together and "tacked" in place with a few welds. The electric arc is then used to complete the welds, a number of different makes of welding machines being used in the plant. All welding is done in the "down" position to insure better welds. This positioning is accomplished by moving the ladles constantly so that all welding can be done down hand.

Steel safety flanges are then welded to the outside of the ladles to give added strength. Some of these flanges are stamped and formed out of lighter material for the smaller ladles, but they must be cut from heavy steel plates for the bigger ladles.

After all the principal welding is done, the huge ladle then is carried on an overhead crane, deposited on a special car and is shoved into a monster annealing furnace, more than 25 feet high. Here it is "soaked" at a temperature of 1200 degrees Fahr. to relieve the stresses from welding.

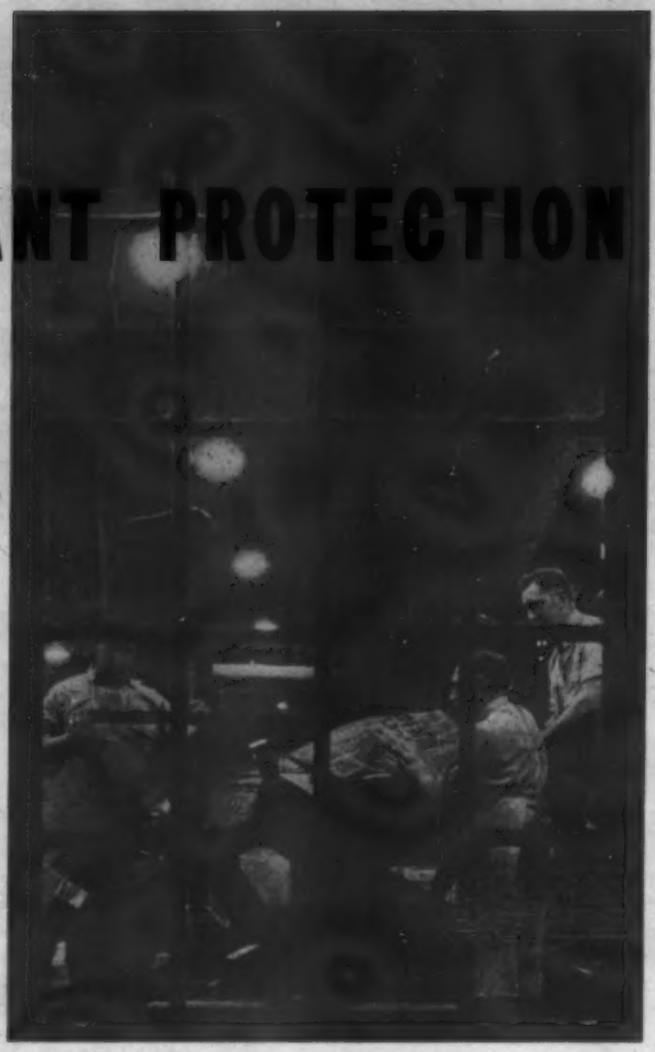
When the ladle comes from the furnace, the sides of the shell are built up further by riveting on heavy metal plates. Now forged steel trunnions are forced into the holes bored into these metal plates. And the ladle is virtually ready for shipping.

One of the nation's largest builders of blast furnaces, this company has its equipment in virtually every steel plant in the United States and in many in foreign countries. The furnaces it has built are turning out more iron than all the Axis blast furnaces combined.

Welders work inside and outside this hot-metal ladle for a ladle car. Note provision for rotating the fabrication for downhand welding

How to Organize your

PLANT PROTECTION SYSTEM



PLANT protection not only includes both internal protection and security which covers fire, accident, espionage and sabotage, but it also includes passive plant protection which covers protection of production, personnel, property, and materials from the effects of air raids.

Passive plant protection can be divided into two sections: First, personnel management and organization. This includes organizing and training for the five protection services (fire, air raid warden, police, medical, operation, and maintenance). Second, physical installation or construction which includes blackout, protective construction, protective concealment.

Joint Committees: Although the primary responsibility for plant protection rests with management, a labor-management committee on plant protection composed of representatives of both management and workers should be formed in every single plant.

In those plants or departments where the workers belong to a labor organization, the union representatives should constitute the labor half of the joint committee. Employes should volunteer for defense duty within the plants where they work; in this sense, the plant has prior claim to the worker over the local civilian defense organization. Employes should be informed of the manner in which the Civilian Defense Council is protecting their families. Similarly, employes should know of the measures being taken for their own safety in the plant.

Plant Organization: Plant defense closely resembles the community's pattern of civilian defense, viz: The plant defense co-ordinator corresponds to the commander of the Citizens Defense Corps, being empowered to initiate, direct, and supervise the entire organization. The *plant control room* is the central headquarters where all reports of damage are received and from where the various services are dispatched. Larger plants may be divided into *divisions*, each in command of a *division co-ordinator* with a *division control room*. Basic subdivision of all plants is the *Post* under the direction of a *Post Warden* who is often a foreman.

Duties of the Defense Co-ordinator: Before adopting a suitable plan for his plant, he should consult federal authorities, the local Defense Council, local public officials, and civilian defense authorities of neighboring plants. In order that his organization may function effectively 24 hours a day regardless of shift, part-time operations, or shut-down periods, he should appoint authorized and competent *deputy co-ordinators* to assume his responsibilities in his absence.

If necessary, he may also appoint *division co-ordinators* and a *training chief*.

Training of the employes should be conducted by the local defense authorities in accordance with prescribed Office of Civilian Defense requirements. The defense co-ordinators should establish an effective emergency organization to act on a moment's notice. During an actual raid, he should, by personal check and reports, make certain that the various services are ready for action and that such precautionary measures as blackouts have been taken.

Communications: So that continuous contact is kept with outside points and with those inside the plant, a positive, efficient, and dependable communications system is necessary. The center of communications in each plant is the *plant control room* which should be situated where it will provide the greatest safety to the staff and to equipment. Control charts and maps of the plant's premises should be on hand and complete information on the progress of any incident should be maintained at all times.

In larger plants divided into divisions, *division control rooms* (similar to the plant control room) should be established. It should be with local Civilian Defense authorities to receive air-raid warnings *at all times*, either direct from the local control center or by a chain calling system of communications. So that warnings may be transmitted quickly, alarms must be established within the plant. Although the telephone is the basic medium of communication, foot messengers, radio, police and fire call boxes should be ready in case telephone service breaks down.

The Five Services: Each of the following services is commanded by a chief who is directly responsible for it:

Fire: During wartime the fire menace increases when production is increased and plants operate longer. Fire from sabotage and incendiary bombings are added dangers. In most industrial plants specific responsibility for fire prevention

From information made available by United States Office of Civilian Defense.

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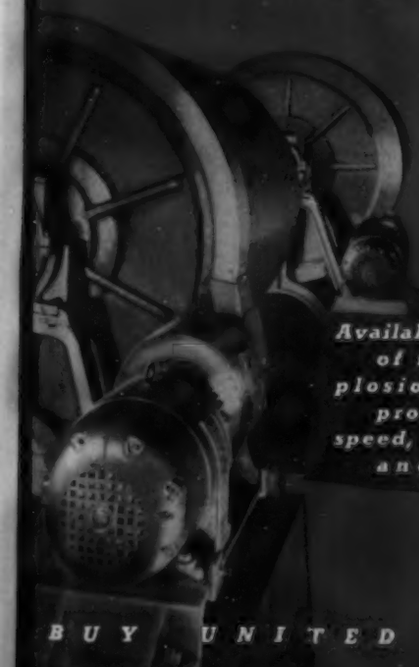
MASTER GEARHEAD MOTORS

THE MASTER ELECTRIC COMPANY • DAYTON, OHIO



Available in a wide range of types including explosion proof, splash proof, fan cooled, multi-speed, uni-brake motors and Speedrangers.

Save material and save space with simple, compact, integrally built Master gearhead motors.

BUY UNITED STATES WAR BONDS AND STAMPS

and extinguishment is vested in a plant fire chief. He should know the construction, occupancy, and hazards of every building and plant under his care, and inspect the entire plant comprehensively at least once a week; in co-operation with the defense co-ordinator, appoint and instruct competent deputies who can be on duty at the plant *at all times;* in co-operation with the chief air raid warden, organize and drill regularly a plant fire brigade, select fire lookouts; understand that automatic sprinkler equipment, to be effective, must be complete in its coverage and be in service instantly when fire occurs.

Air Raid Warden: This service may be set up under the fire chief, police chief or as an independent group. The *chief air raid warden* should be assisted by deputy wardens. Duties of wardens: Be familiar with all local warning and communications systems; know where and how to report damage; understand the complete details of blackout in the areas of the plant to which they are assigned; guard against the starting of fires, damage of machines, or other acts of sabotage during black-outs.

Since people are generally safer in a plant than if they leave it, general evacuation should be avoided. When employes are transferred to the "safety" area, wardens should see to it that individual machines, processes, etc., have been shut down.

Police: This service is responsible for maintaining discipline, safeguarding personnel property, and operations. A *police chief* should be appointed to head this service. With his assistants he should: Guard against damage to vital machines, tools, equipment, power stations, raw materials, finished products; safeguard vital records, specifications, explosives, instruments, blueprints, and other confidential data; patrol all inside and outside areas on the plant premises; closely guard gatehouses or plant entrances; see that watchmen are physically and mentally qualified for their work and provided with proper equipment; control all internal and vehicular traffic to allow necessary air raid squads to reach scenes of accidents; during air raids, maintain discipline.

Medical: The emergency medical service is merely an expansion of the plant's usual medical program. To care for the injured, all industrial plants must provide medical services and first-aid equipment within the plant. In collaboration with the *chief of the emergency medical services* of the locality, each plant should plan for: The use of ambulances and emergency medical field units when needed; the use of beds at one or more hospitals to which severe casualities may be taken; a *casualty station* within a short distance of the plant to care for the slightly injured who do not need hospitalization. During an emergency, a *first-aid post* should be established as near as possible to the casualties. Trained stretcher bearers, composed of four individuals, should be organized (at least 5 per cent of plant personnel should be trained in these duties). Although most plants will depend largely on surrounding communities for ambulance service, improvised ambulances should be ready in case of an emergency.

Operations and Maintenance: The *operations and maintenance chief's* duties include protecting buildings, equipment, and supplies which maintain production. He should be a competent all-around engineer and have, as assistants, mechanics skilled in plant fields such as electricity, steam, gas and water. He should be thoroughly familiar with the plant's boiler equipment, valves, piping, and electrical circuits; handling, storing, and processing of chemicals as well as special or key materials and processes.

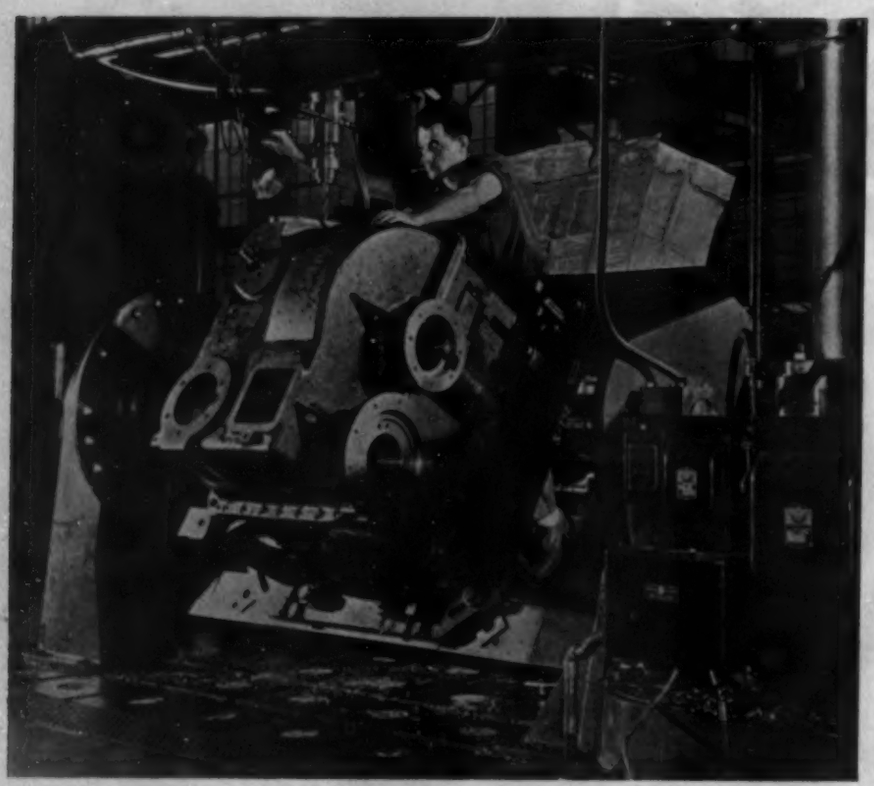
Protective Construction: The seriousness of aerial bombings on the type of the bomb, fuse setting, impact velocity, angle of the bomb's impact, nearness of the hit, etc. The hit may be direct, lateral or vertical. Every building is a problem in itself. Demolition bombs weighing up to 1000 pounds have been known to penetrate from two to six floor slabs before detonating. One of the most commonly used incendiary bombs today weighs 2.2 pounds. A 4 to 5-inch reinforced concrete roof can prevent penetration of such an incendiary. However, newer, heavier, and more dangerous incendiaries are being dropped by the enemy. Although no place is safe from a direct hit of a heavy bomb (demolition or incendiary), precautions can minimize destructive effects.

The following types of plants present separate problems: Steel-frame, single-story shed buildings; multi-story steel or reinforced-concrete-frame buildings; multi-story, wall-bearing buildings; other single-story buildings.

British experience has shown how necessary it is to protect vital factory points. Trivial damage may suspend production for long periods; care should be taken that one bomb will not bring about

(*Please turn to Page* 146)

"MANPOWER SAVER"



FROM 24 to 32 hours per week are being saved with this indexing trunnion fixture in drilling 1000 to 2000-pound marine gear castings involving about 110 holes at one of General Electric's plants. It positions casings for drilling at any angle in a full circle and at any plane. Operator here is drilling a casing tilted at a 45-degree angle. Formerly each piece of work was set up at least six times requiring the use of a crane each time

Universal Camming means that CLEVELANDS CUT COSTS

EVERY operation on a Cleveland Single Spindle Automatic is controlled by standard cams, easily reached and quickly set to any position with the aid of a universal adjustment feature. Set-up time is reduced to a remarkable minimum by the speed and ease with which tools can be readied for processing of any job within the scope of the machine. ● With men responsible for production, Cleveland Single Spindle Automatics have a reputation for two important advantages: **1.** Maximum sustained production on long runs, with minimum down time for adjustments. **2.** Profitable economy on small lot, short run jobs. **CLEVELANDS** are proving on hundreds of war production jobs that they **cut costs** *and* speed production.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

CLEVELAND, OHIO

SALES OFFICES

CHICAGO: 20 North Wacker Drive, Civic Opera Bldg., Room 1408
DETROIT: 540 New Center Building
NEWARK: 902 American Insurance Bldg.
CINCINNATI: 1315 American Building

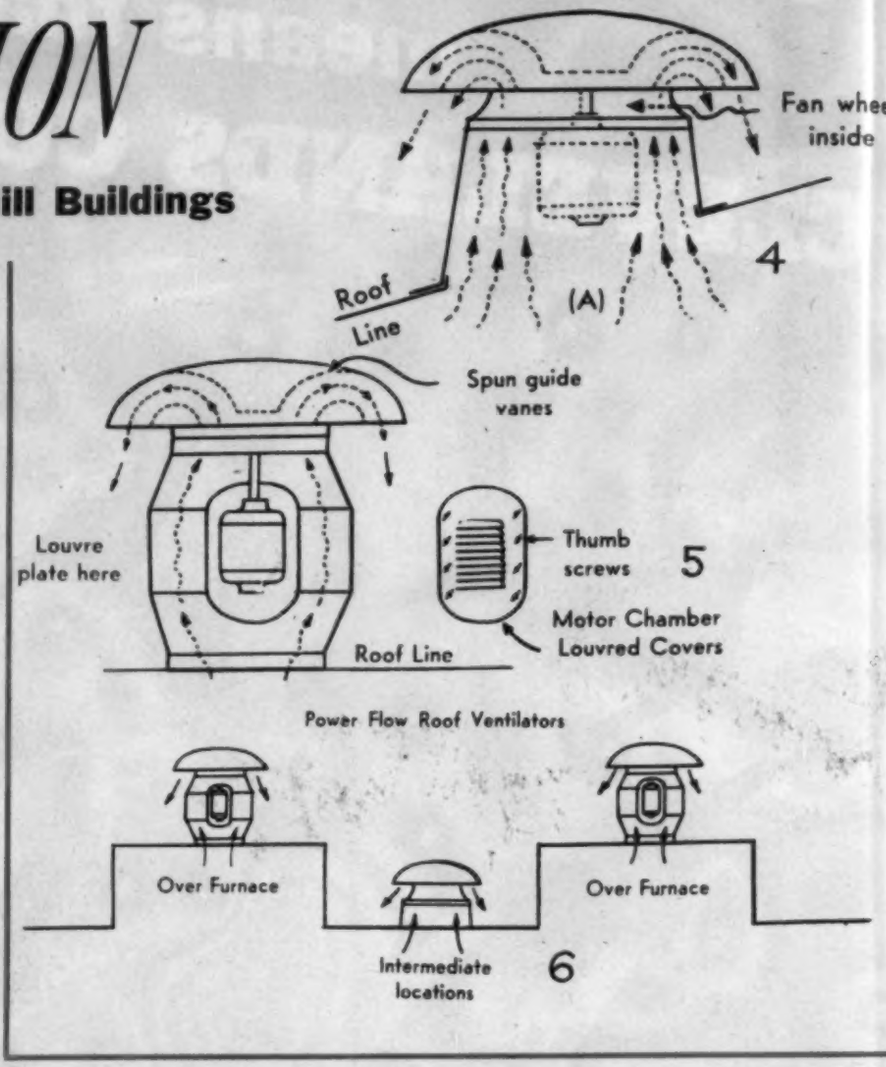
★ ★ ★

VENTILATION

for Steel Mill Buildings

By G. E. WALLIN

DeBothezat Ventilating Equipment Division
American Machine & Metals, Inc.
Chicago



(Continued from Last Week)

OPERATION of a steel mill produces many problems, but among the most vexing are those involving ventilation. Difficulties of actual physical production can be met and conquered—"you can get your teeth into 'em." Application of power ventilation, however, evades the grasp of most operators because they have not been able to devote sufficient time to its study. This article, therefore, offers some suggestions for solving such difficulties by indicating how other mills have been helped.

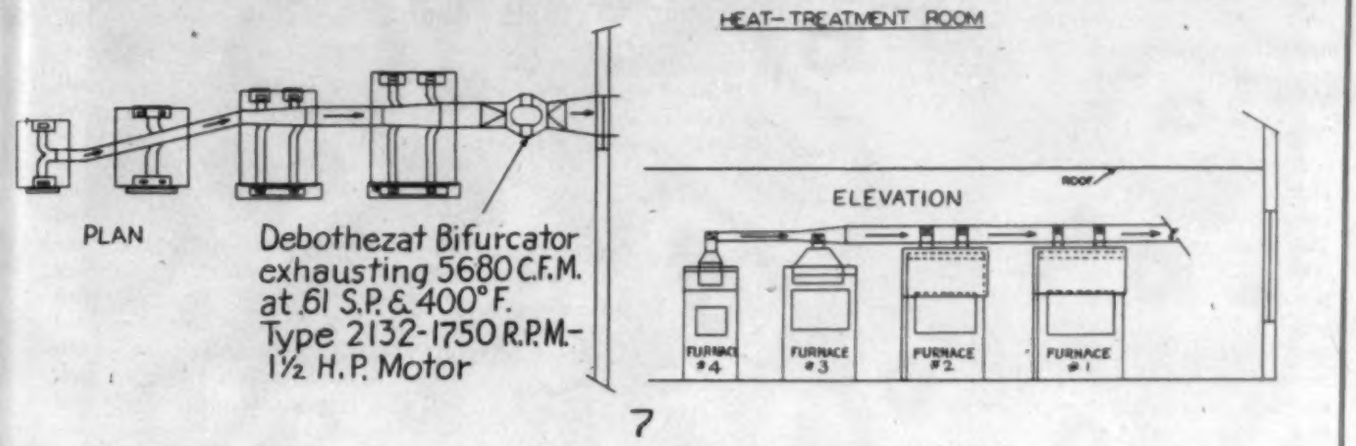
The plant engineer confronted with steam, chemical fumes, or hot air removal wants to know how much, where, and how can he get rid of them. Everything connected with ventilation appears to him vague and intangible. If he only had a neat little book where he could find the exact volumes, exact size of equipment; exact size of ducts, hoods, and slots! But he would still need the knowledge of how to co-ordinate all of them. Experience and "know how" is 90 per cent and the data with which to work are the balance of the job.

A ventilating engineer should determine first of all the character of the problem. What is the excessive heat in the building—how many B.t.u.'s? Are the sources of heat spread around the building, or are they confined to small area? Can individual hoods and duct work capture the heat at its source, or must a general exhaust be used? If live steam enters a tank of pickling acid directly, how many pounds per hour evaporate after allowing for condensation due to heat losses to the room and to material passing through the tank? If an etching tank or pickling tank is producing fumes, how much liquid surface is exposed to the room air? If hot metal enters and leaves a building—what is its volume, its temperature, the length of time and where? All such data are part of any specific problem, and should determine volumes, method of handling, and size of equipment.

Removal of excessive heat from steel mill buildings is one of the problems frequently encountered. When temperatures just below the roof line are to be maintained below 120 degrees Fahr. with the fans operating, power flow roof ventilators with direct-connected, totally enclosed, ball bearing motors in the air stream, as shown in Fig. 4, are used. For temperatures of 120 to 150 degrees Fahr. the same units are used, but equipped with Class B (glass insulated) motor windings.

If the air in the building is above 150 degrees, however, or if it is dirty, or filled with fumes injurious to motor windings, the steel mill operator should use a bifurcator type (literally two-forked) power flow roof ventilator with open frame ball bearing motor, and without any bearings in the air stream. A louvred plate usually covers the two motor-chamber openings to prevent rain or snow from wetting the motor, as shown in Fig. 5. For temperatures ranging from 250 to 350 degrees Fahr., the same type unit should be used, but with asbestos-lined motor chamber to prevent radiation of heat to the motor.

One of the new steel plants on the West Coast has its open-hearth building designed with a low roof. A large number of 48-inch bifurcators and about the same number of power flow roof ventilators were installed on the low-type roof against the advice that only natural ventilation could be used with any measure of success. (Fig. 6) The volume of air required to eliminate the heat was determined after a maximum outdoor temperature and desired indoor temperature were fixed. The Btu's put into the room air by the furnaces and hot metal each hour were calculated from data obtained from a mill in the Chicago area.



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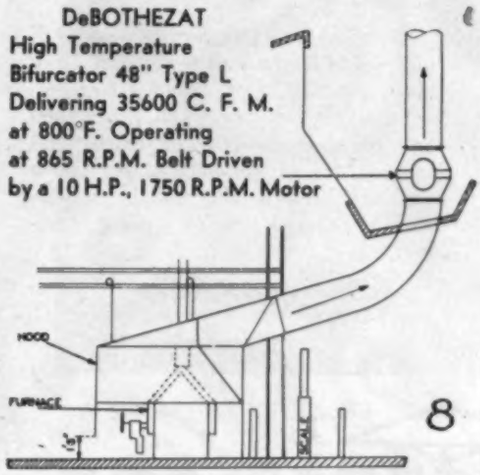

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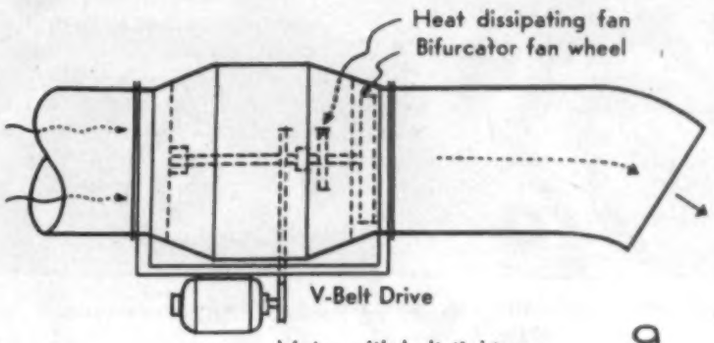

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Fig. 4—Power flow roof ventilators. Top of ventilator tilts and locks in position for access to motor

Fig. 5—Two-forked type ventilator for removing air above 150 degrees

Fig. 6—Low-roof open-hearth building equipped with two types of ventilators

Fig. 7—Application of individual hoods, ducts and bifurcator for removing high temperature air from heat treating department

Fig. 8—High-temperature bifurcator for handling 800-octane gases

Fig. 9—Application of principle of trapping heat directly at source

Knowing the amount of heat in Btu's per hour going into the air of the building, its cooling then depends on the temperature and the volume of the outside air which enters the building to replace that which is exhausted by the fans. The cubic feet of air per minute measured at 68 degrees Fahr., which is standard for fan manufacturers, may be determined as follows:

$$\frac{\text{Btu's per hour} \times (460 + t_d)}{60 \times 0.25 \times 0.075 \times (460 + 68) \times (t_d - t_o)}$$

where,

t_d is desired room temperature, and t_o average maximum outdoor temperature. Usually t_d is fixed at about 10 or 20 degrees above t_o.

In certain cases, a few high temperature sources heat the air in a building to an uncomfortable degree. Instead of allowing the heat to spread throughout the entire space, it is better if possible to trap it with hoods at the source. A main duct with branches to individual hoods can then be connected to a bifurcator, which, in turn, will discharge through a duct to outdoors.

Sizing of ducts and hoods should be considered in conjunction with the horse power and unit sizes available from the fan manufacturer. The heat treating furnaces, shown in Fig. 7 were fired with gas; and the number of cubic feet of gas burned per hour was known. Heat content was 800 B.t.u.'s per cubic foot. Ten cubic feet was allowed as the volume of air and products of combustion leaving the furnace for each cubic foot of gas consumed—all figured at 68 degrees Fahr. (The volume, of course, expands when heated to furnace temperature.) Sufficient room air was mixed with the flue gases, after leaving the furnace, so that the fan bearings (or motor bearings) would not be overheated.

By using a high-temperature bifur-

cator, (Fig. 8) gases up to 800 degrees Fahr., temperature may be handled safely without any special cooling for fan bearings other than a heat dissipating disk on the shaft. The fan shaft runs in ball bearing pillow blocks located in what is normally the motor chamber. The motor itself is mounted below the motor chamber and drives the fan by a V-belt on short centers. The whole unit is self-contained.

An application of the principal of trapping heat directly at the source—in this case, a converter, is shown in Fig. 9. The temperature of the steel melt was 3000 degrees Fahr., and 3600 cubic feet per minute was forced through it by the usual pressure blower. A high-temperature bifurcator holds the exhaust temperature at 800 degrees or less. The maximum room temperature was assumed to be 100 degrees Fahr.

The heat above 100 degrees Fahr. to be absorbed amounts to 142,000 B.t.u.'s and is determined by multiplying the temperature difference (3000-800 degrees) by the air volume (3600 cubic feet per minute) by the air density at 68 degrees Fahr. (0.075) by the specific heat of air (0.24).

The volume of air required to be taken from the room to absorb 142,000 B.t.u.'s and thus reduce the 3000-degree air to 800 degrees for the bifurcator to handle is determined as follows:

$$\frac{142{,}000}{(800-100)\times 0.24} = 850 \text{ pounds/minute}$$

This weight of air measured at 800 degrees Fahr. amounts to

$$850 \times \frac{(460+800)}{(460+68)\times 0.075} = 27{,}000 \text{ CFM}$$

Air passing through the converter amounts to 3600 cubic feet per minute measured at 68 degrees Fahr. This volume measured at 800 degrees is:

$$3600 \times \frac{1260}{528} = 8600 \text{ CFM}$$

Room air plus converter air all measured at 800 degrees Fahr. is 27,000 + 8600 or a total of 35,600 cubic feet per minute—the required capacity of the bifurcator. However, a 48-inch (size of fan wheel) high-temperature bifurcator driven at 865 revolutions per minute through a V-belt by a 10-horsepower 1750 revolutions per minute open ball bearing motor, was employed. The fan wheel and shaft were constructed of heat resisting stainless steel.

One of the most interesting and successful applications of the high-temperature bifurcator was for each of two wire annealing furnaces at a mill in the Chicago area. The capacity was based on the maximum size of wire, namely ⅜-inch diameter. About 72 wires were run through each furnace in continuous strands; and after leaving the furnace they passed over steel guide wheels, and thence to reels on which the wire was wound automatically. The wires came from the furnace at about 1800 degrees Fahr., and could not be approached without intense discomfort. Besides, the building was low, of small floor area, and both furnaces operated at once.

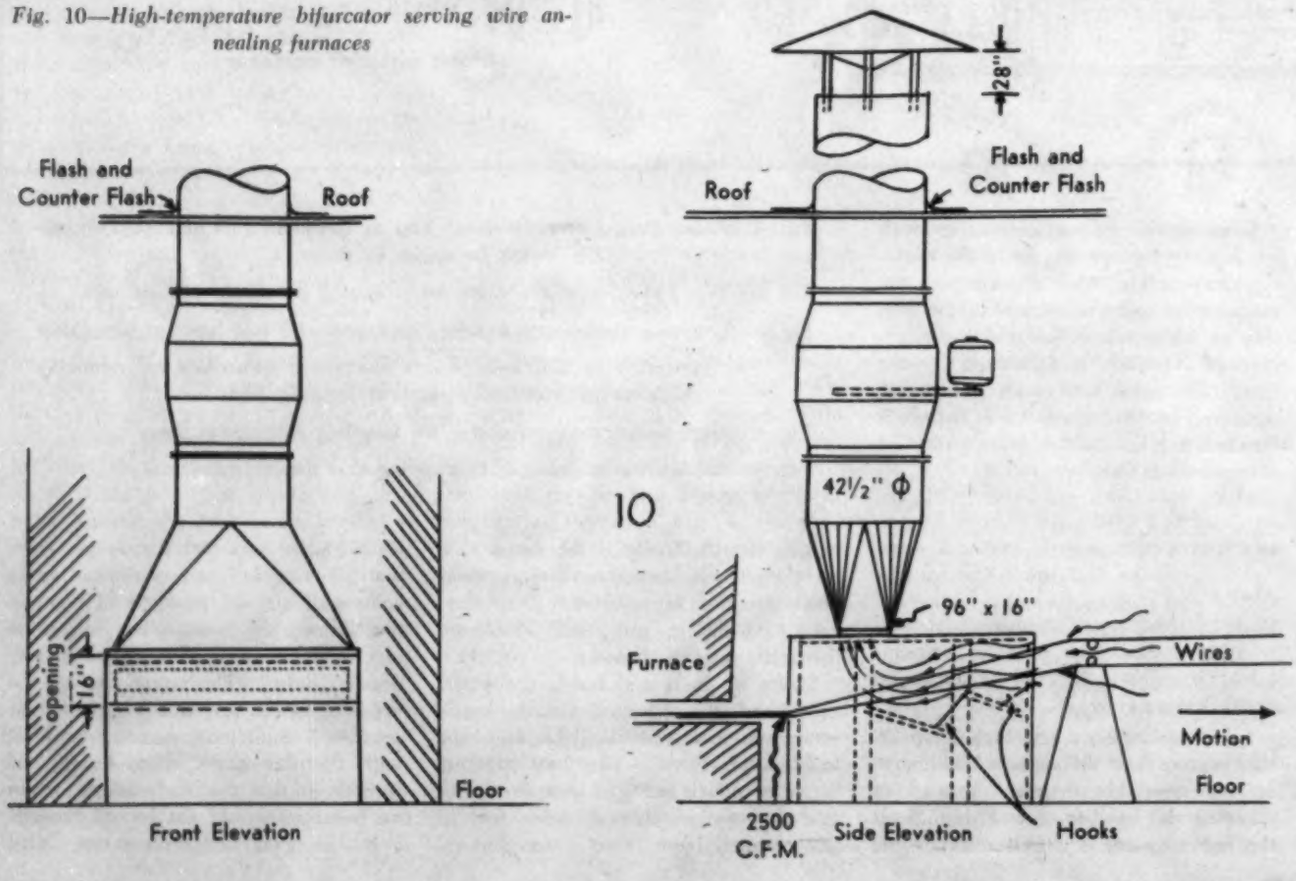
The space between the furnace and guides was housed within heavy sheet steel, using the floor for the bottom of chamber, as shown in Fig. 10. A horizontal opening was left at the guide end of sufficient size to handle the required volume of cooling air. Baffle plates were designed to guide the air zig-zag over the wires, but the plant engineer decided not to install them. The system used the principle of counterflow, that is, the coolest air came in contact with the coolest wires first, and became more heated as it passed over the on-coming material, finally exhausting through the bifurcator.

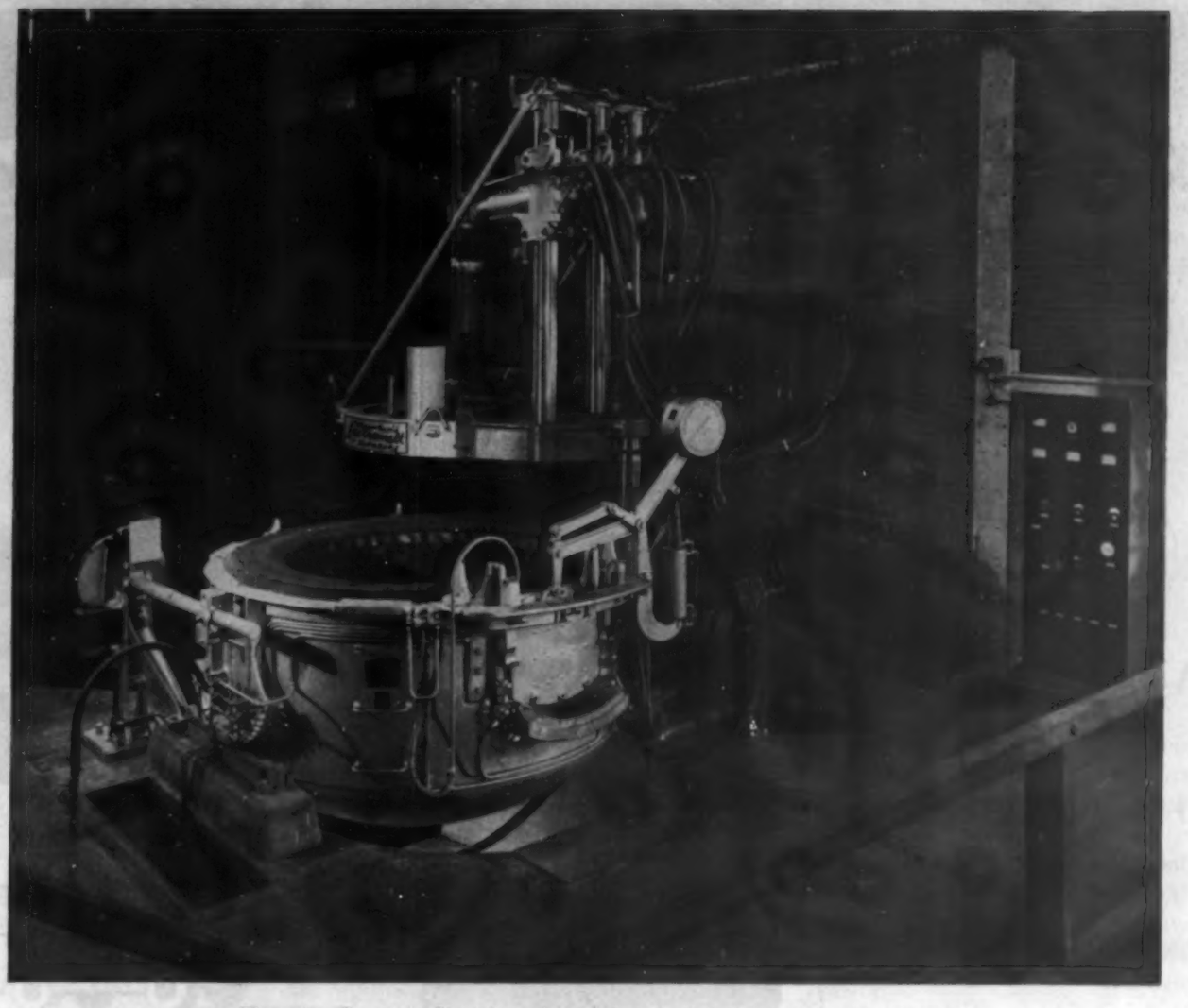
In order to determine the volume of air required, the following data were necessary: weight of wire per foot, average specific heat of iron between 1800 and 100 degrees, speed at which wires moved forward, distance in feet across cooling chamber, and initial temperature of material entering cooling chamber.

The B.t.u.'s per minute above 100 de-

(*Please turn to Page* 147)

Fig. 10—High-temperature bifurcator serving wire annealing furnaces





Three ton Lectromelt with roof raised and rotated ready for charging

FOR SPEED *and elimination of waste*

● Lectromelt furnaces of the top charge type are producing increased tonnages of steel per man hour through simplified and economical operation. Top charging has the advantage of continuity of operation by lessening the time between heats, thus conserving heat in the furnace from a previous melt. They permit the use of bulky open charge type of low cost scrap, which melts with good efficiency and low power usage. The size of scrap is limited only by the diameter of the furnace crucible.

Lectromelt furnaces are designed for efficient operation and are ruggedly built to give long service. The top charge type is available in standard sizes ranging from 100 tons to 250 pounds capacity.

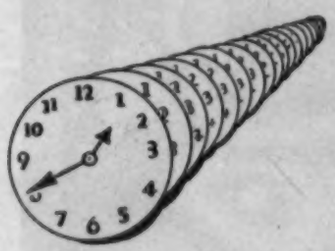
MOORE RAPID
Lectromelt
FURNACES

Pittsburgh Lectromelt Furnace Corporation
Pittsburgh, Pennsylvania

The Furnace of Today and Tomorrow

168 Hours per Week!

Modern industrial trucks are working 168 hours a week. This is necessary to keep war production lines adequately supplied with materials. Other trucks, not so modern and, up to this time, never even considered for such continuous service, can be batteried to give the same kind of service. Write our nearest office for suggestions.



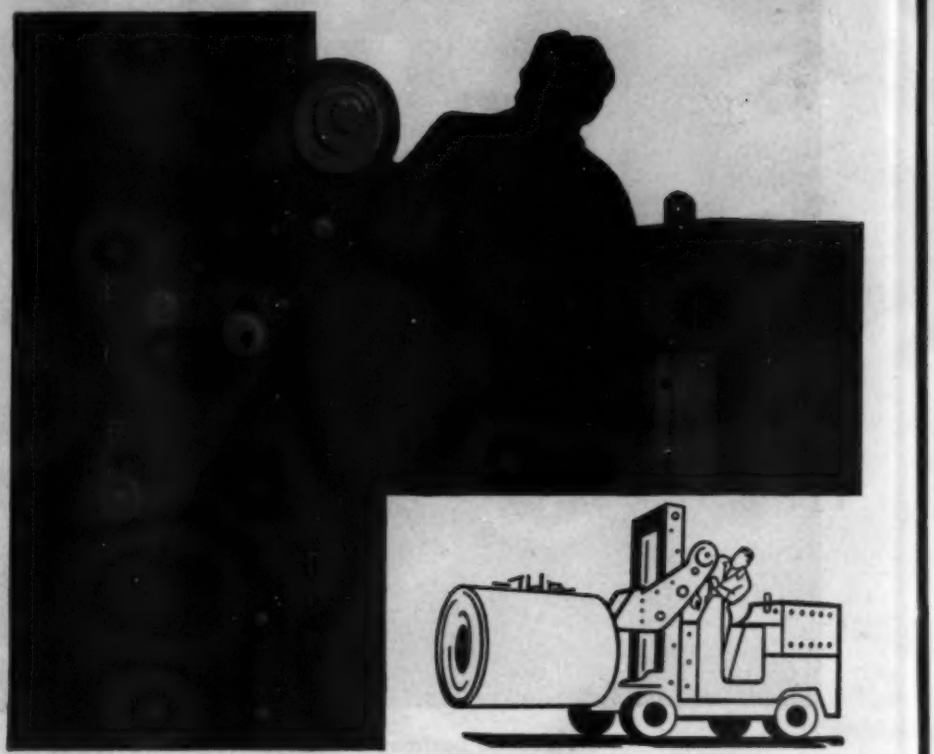
Alibis are Seldom Alkaline.

For every production dip there must be a suitable explanation. Few material-handling delays have ever been attributed to failure of an alkaline battery. Its performance is predictable. It does not fall down on the job without warning. On such reliability are production records written.

Skid Racks. Many war plants are producing parts machined to close tolerances which require careful protection against damage in handling through the subsequent processes. By the use of skid racks they have not only avoided spoiled work but have also saved many handling motions. And, they have avoided time losses that could never be retrieved. When a plant is on a war schedule, there's no time left!

Edison Storage Battery Division
Thomas A. Edison, Inc.
WEST ORANGE, N. J.

THIS POWER must not fail



Battery industrial trucks are literally the internal supply lines of our war industries. They keep materials on the move all the way from incoming to outgoing carriers. Their power-units are their strength . . . they must not fail.

And that's the biggest single reason why over half the battery industrial trucks of America are powered by Edison Alkaline Batteries. They provide the most dependable battery power the world has ever known, an Edison invention. Dependability is the reason for their success in mines, on railroads, throughout industry and aboard ship. Electrically, chemically, structurally, they are made to order for today's stringent demands.

INDUSTRY NEEDS THE DEPENDABILITY OF

Edison Alkaline BATTERIES

Fig. 1—Consolidated PBY bombers-in-the-making move along assembly line at flight level. Hulls are mounted on padded carriages designed to fit hull contour. Platforms connect hulls at upper working level as shown here. Link-Belt Co. photos

"FLIGHT LEVEL"

Assembly Line Conveyor Speeds Bomber Production

"PBY" BOMBER planes, built by Consolidated Aircraft Corp., are the long range patrol bombers to which the British affectionately refer as Catalina bombers. It was one of these, you will recall, that played such an active part in the sinking of the Bismarck in the north Atlantic.

Foreseeing the need for greater efficiency and speedier production, the engineers of the Consolidated Aircraft organization conceived the idea of mounting and connecting more than two score PBY hulls on one assembly line and moving them through the various stages of assembly by means of a conveyor, until these hulls were ready for their wings.

This decision was reached in the early part of 1940, at which time the hulls were mounted on their beaching gear, consisting of two large dual wheel assemblies bolted to the front section of the hull, and one tail wheel, and were not carried at flight level.

At that time, when working on the hulls in the normal flight level position (the position that the production man has found to be best), each ship had to be leveled individually, which was both expensive and very time-consuming.

The problem was how to mount the ship in the proper position initially, in order to avoid these troublesome delays, and to keep the assembly line moving at a steady pace.

We might here explain that when the ship is assembled at normal flight level, the workman requires only an ordinary hand level to properly line up or plumb a bracket, table or fitting. Therefore, and as there are no straight lines from which one can measure on the hull of a ship, the flight level assembly method greatly simplifies the work.

Gun mounts, instruments—all have to be set so that they will be parallel to the axis of a ship in flight.

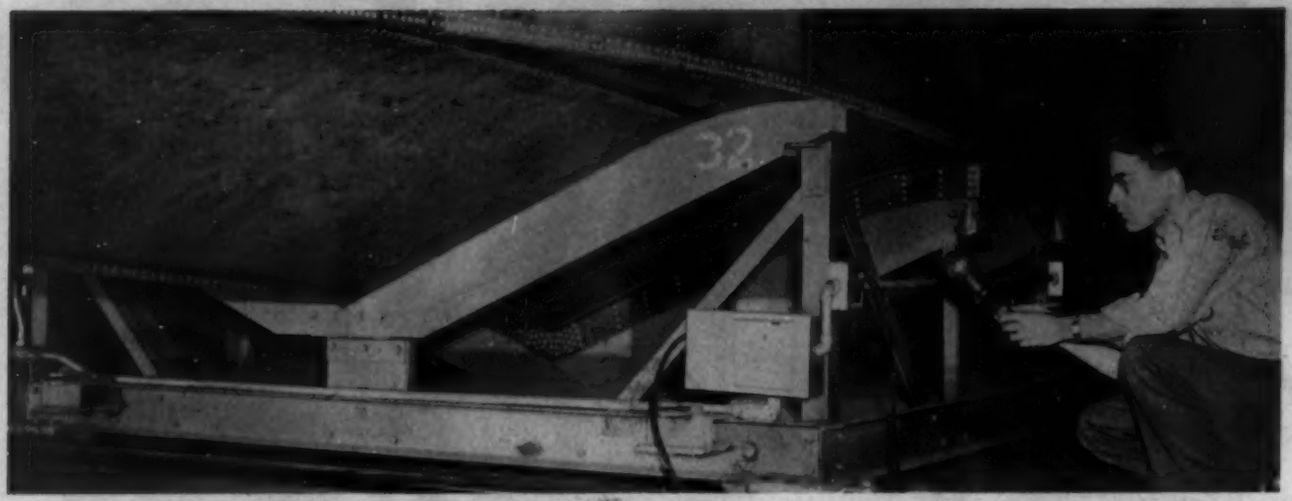
Modern Assembly Line: To solve this production problem, Consolidated Aircraft engineers and production men collaborated with the engineers of the Link-Belt office in Los Angeles, and together they evolved the modern mechanized assembly line now being used to produce the planes.

In this connection, it was determined that it would be more advantageous to apply the beaching gear after the hull came off the assembly line.

Briefly, this new mechanical handling system consists of wide gage, accurately leveled, self-cleaning steel tracks of the shape of an inverted Vee, extending throughout the length of the assembly line; a separate hull-supporting cradle for each hull to be assembled; draw bars specially designed by Consolidated engineers to connect these cradle carriages to each other and permit quick detachment; and a short double-strand chain and pusher conveyor at one end of assembly line, for moving the line of hulls ahead when the signal is given to advance to the next assembly station.

When the assembly line has moved forward the proper distance, a limit switch automatically brings the conveyor to a stop.

An overhead crane thereupon removes



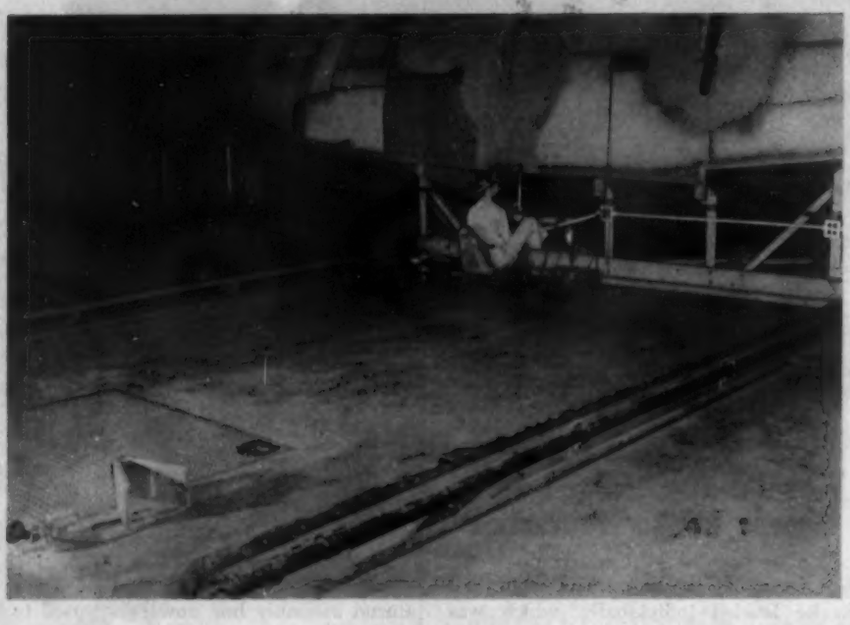


Fig. 2. (Above)—Closeup of padded hull carriage. Note electric outlets are part of carriage. At right, near floor is one of the drawbars that connects this hull carriage to next

Fig. 3. (Left)—Short length of conveyor (20-foot section) moves entire line since all carriages are connected by drawbars. Soon as leading carriage reaches end of conveyor, it trips limit switch, stopping conveyor. Leading carriage has hull lifted off by overhead crane which later moves carriage back to start of line. Pushers on chain conveyor now bring up next carriage

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the ship to another bay of the building, where the beaching gear is applied. It is then ready for installation of the wings and motors. An overhead crane also returns the empty carriages to the beginning of the assembly line, to receive another hull.

The hull-supporting carriages are made of structural steel with timber supports which are cut to conform with the contour of the hull when the ship is at flight level, and also are padded with a heavy felt to prevent scratching the anti-corrosive coating. Each carriage is equipped with four grooved track-wheels, fitted with anti-friction roller bearings, turning on fixed steel axles.

The conveyor for moving the entire assembly line ahead is only about 20 feet long, and its drive shaft, 3-horsepower motor and variable speed transmission, are depressed below the level of the floor.

The conveying medium consists of two strands of "SS" class bushed steel chain with three sets of heavy-duty pusher lugs equally spaced, for engaging the hull-supporting carriages. Only one set of pushers is in use at a time.

Cast Iron Radiator Practice Before Industry

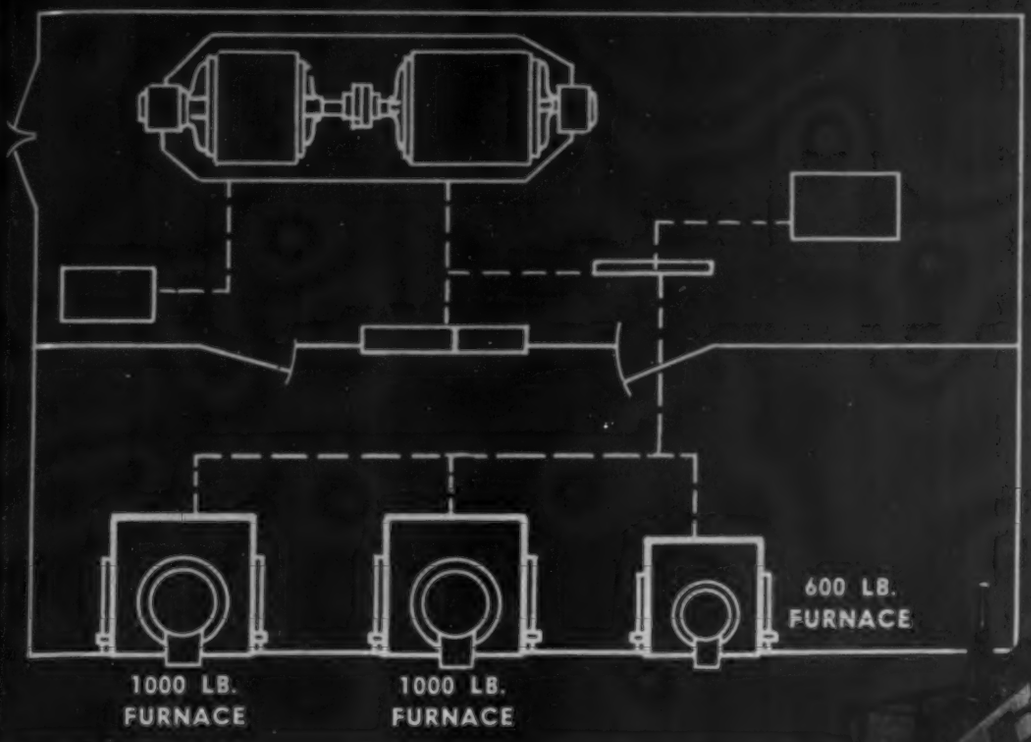
Standing committee in charge of simplified practice recommendation R174, large tube cast iron radiators, reports the approval of the simplified list of small tube radiators permitted under schedule VI of Limitation Order L-42 for the present list of large tube cast iron radiators included in R174-41, according to the United States Department of Commerce, National Bureau of Standards, Washington.

The proposed recommendation, which was mailed to all interests for consideration and approval, will retain the serial number of R174 but the title will be changed from "Large Tube Cast Iron Radiators" to "Cast Iron Radiators".

In event the industry again manufactures large tube radiators after the war, the recommendation can be revised to include both large and small tube radiators.

Revised recommendation lists 10 stock sizes of small tube radiators as follows: 3-tube in 25-inch; 4-tube in 19, 22 and 25-inch; 5-tube in 22 and 25-inch; 6-tube in 14, 19, 25 and 32-inch. The catalog rating in square feet and dimensions are given for each size. Other information for the simplified line includes hydrostatic test pressure, method of assembly, location of tappings and air vents, painting and method of identification in trade literature.

Mimeographed copies of this recommendation may be obtained without charge from Washington.



1000 LBS. OF ALLOY

melted, rolled, shipped

IN 24 HOURS

Receiving a rush order for 1000 lbs. of finished stock is nothing to get excited about, if you have Ajax-Northrup high frequence furnaces.

In this case, it was melted in one hour — an exact duplicate analysis. The ingot was rushed to the soaking pit, rolled, and the shipment left the plant during the same day. None left over for stock — nor did the customer have to wait for accumulated orders.

In these days of tailor-made analyses, of quantities ranging from 10 lbs. to 10 tons, of necessity for speed and accuracy, high frequency melting equipment is "worth its weight in gold," as one user puts it. 59

PRODUCE NOW AND PREPARE FOR PEACE

The same equipment that insures volume and speed now, can be converted to produce smaller melts at low cost later on. Or it can be used for heating, brazing and a dozen other applications.

AJAX HIGH FREQUENCY FURNACES

NORTHRUP AJAX ELECTROTHERMIC CORPORATION, AJAX PARK, TRENTON, N.J.

ASSOCIATE COMPANIES: THE AJAX METAL CO. *Non-Ferrous Ingot Metal for foundry use.*
AJAX ELECTRIC FURNACE CORPORATION. *Ajax-Wyatt Induction Furnaces for melting.*
AJAX ELECTRIC CO., INC. *Ajax-Hultgren Salt Bath Furnace and Resistance Type Electric Furnaces.*
AJAX ENGINEERING CORPORATION. *Aluminum Melting Furnaces.*

Standard Sampling Methods

. . . . are explained by American Iron & Steel Institute as they apply to checking the chemical analyses of steel shipments

IN STANDARDIZED sampling practice, each melt of steel in a lot or shipment is considered separately, according to information recently released by American Iron and Steel Institute. To indicate adequately the average composition of a melt or lot, it is recommended that samples selected to represent the melt as fairly as possible be taken from a minimum number of pieces as follows:

3 pieces for lots 5 tons or less,

4 pieces for lots over 5 tons to 10 tons,

5 pieces for lots over 10 tons to 15 tons,

6 pieces for lots over 15 tons.

If the number of pieces from a melt is less than the number of samples specified above, one sample shall be taken from each piece.

If chips are taken by drilling, a drill having a diameter not less than shown in the following table must be used.

Area of cross-Section to be Sampled, sq. in.	Minimum Drill Diameter, in.
To 16	½
Over 16	1

When chips are taken by methods other than drilling, they should represent areas equivalent to those of drills having the diameters noted above.

Drillings or chips must be cut without the application of water, oil or other lubricant and must be free from scale, grease, dirt or other foreign substances.

The chips should not be overheated during cutting to the extent of causing decarburization. Chips must be uniform and well mixed. Chips too coarse to pass a No. 10 (2000 microns) sieve or too fine to remain on a No. 30 (590 microns) sieve are not recommended. Sieve size numbers are American Society for Testing Materials designations.

Material subjected to certain heating operations by the user may not give chemical analysis results which properly represent its original composition. Therefore, users analyze chips taken from the material in the condition in which it is received from the steel manufacturer.

When samples are returned to the producer of the steel for check analyses, the samples should consist of pieces of the full-size section, if practicable, rather than chips, unless chips are especially requested.

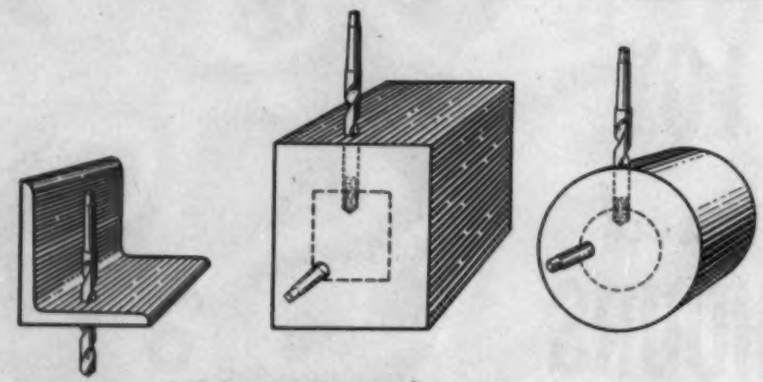
Location of Samples: Because of segregation, the location at which samples for check analysis are obtained is important. The following methods are recognized as standard for varioius sections:

—Applicable to any small equiaxed section such as rounds, squares, hexagons and the like. Chips are taken by milling or machining the full cross-section of the piece.

—Applicable to products where one axis of the cross-section greatly exceeds the other, such as the bar-size shapes and light flat bars. Chips are taken by drilling entirely through the material at a point midway between the outside and the center of the section, or by milling or machining the entire cross-section. See Fig. 1.

—Applicable to bored forgings. Chips are taken midway between the inner and outer surfaces of the wall.

(*Please turn to Page* 148)



Drill locations for sampling various sections

TABLE I—Standard Variations Over or Under Specified Range or Limit

For Sections Not Over 100 square inches Cross-Sectional Area Nor Over 18 inches Wide or Exceeding 7000 pounds per Piece

Limit or Maximum of Specified Range, per cent		Standard Variation, per cent, Over the Maximum Limit or Under the Minimum Limit: Open-Hearth Steels	Electric Furnace Steels
Carbon	To 0.30 inclusive	0.01	0.01
	Over 0.30 to 0.75 inclusive	0.02	0.02
	Over 0.75	0.03	....
Manganese	To 0.90 inclusive	0.03	0.03
	Over 0.90 to 2.00 inclusive	0.04	0.04
Phosphorus		0.005	0.005
Sulphur	To 0.040	0.005	0.005
	Over 0.040, not subject to check	....	....
Silicon	To 0.35 inclusive	0.02	0.02
	Over 0.35 to 2.20 inclusive	0.05	0.05
Copper	To 0.50	0.02	0.02
	Over 0.50 to 1.00 inclusive	0.05	0.05
Nickel	To 1.00 inclusive	0.03	0.03
	From 1.01 to 2.00 inclusive	0.05	0.05
	From 2.01 to 5.25 inclusive	0.07	0.07
Chromium	To 0.90 inclusive	0.03	0.03
	From 0.90 to 2.10 inclusive	0.05	0.05
	From 2.10 to 3.99 inclusive	0.10	0.08
Molybdenum	To 0.60 inclusive	0.03	0.03
	From 0.61 to 1.00 inclusive	0.05	0.05
Tungsten	To 1.00 inclusive	0.05	0.05
	From 1.01 to 4.00 inclusive	0.10	0.10
Vanadium	To 0.50	0.03	0.03

DOALL in Action OVERSEAS

2nd January, 1943

Messrs. Continental Machines, Inc.
Minneapolis, Minn.

Gentlemen:

We are sending you a photograph showing a batch of DoAlls operated by girls.

Our experience over the last 5 years is quite interesting. Prior to the outbreak of the war, the saving effected on the DoAlls represented a difference between *Loss* and *Profit* when meeting competitors' prices for Gauges, Form Tools and Press Tools. To-day, of course, the saving in time is much more important.

It is not an uncommon thing for us to produce a very intricate Form Tool at 24 hours' notice, and thus remove bottlenecks which, under normal circumstances, would take several weeks of highly skilled labour to overcome the difficulty when using what would be termed orthodox machines and methods.

Yours sincerely,

PRECISION WORKS,
Surrey

NEW HANDBOOK—250 pages of pictures and data about the Art of Contour Machining, with many ways to save man hours and material in metal working plants. Ask for copy.

DoAll Owners—If you have not seen the DoAll Attachment folder, send for copy today. It illustrates equipment for holding and guiding work, mitering, cutting discs, etc.

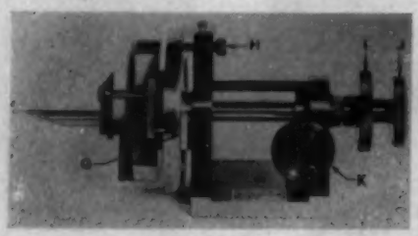
CONTINENTAL MACHINES, INC.
1324 S. Washington Avenue Minneapolis, Minn.

DoAll Offices in 25 cities, each in charge of a trained sales engineer to give you quick service on Contour Machines, DoAll Band Saws and Files, DoAll Gage Blocks and Surface Grinders.

INDUSTRIAL EQUIPMENT

Radius Dresser

Perfex Gage & Tool Co., Detroit, is offering a new angle to tangent radius dresser which deviates from the common method of dressing from the side of the wheel by dressing the wheel at the bottom where the grinding operations actually take place. This also allows the



wheel dressings to be thrown away from the dresser into the dust collector.

Diamond point of the unit automatically sets on center. This is accomplished by the diamond mount construction and the way in which the shank of the diamond tool is ground. According to the company, the unit makes it possible to dress a 0.050 radius to a full half circle without the purchase of additional equipment.

By using a gage block set up, a direct reading from the base to the diamond can be obtained, thus insuring a perfect radius. Construction of the dresser also permits the use of a sine bar to insure accuracy of angles.

Truck Towing Conveyor

Alvey-Ferguson Co., 2 Disney street, Cincinnati, announces a truck towing conveyor installation which eliminates the hard work of pushing and the danger of sparks from electric or gasoline operated towing equipment. It tows loaded trucks through sub and final assembly. Towing hooks of the equipment are easily detached by hand or auto-

matically af any pre-determined location where parts carried are processed or assembled.

The trolley conveyor shown at lower elevation is equipped with swivel hooks used for conveying parts through automatic spray painting machines and drying ovens. Rotating pulley is constructed so parts are mechanically turned during painting process.

Gasoline Generator

Hunter-Hartman Corp., St. Louis, recently introduced a new portable gasoline driven generator for rapid battery charging. It is said to eliminate problems accompanying the use of storage batteries in operations where electric current and conventional equipment for charging are not available.

The equipment is designed to charge 6, 12, 24-volt batteries at 10 to 300 amperes, and consists of a specially designed generator driven by a 6-horsepower single-cylinder air-cooled gasoline engine which is equipped with air cleaner, gasoline filter, magneto, self-starter, rope

Portable Gasoline Engine Driven Generator

starter, gas tank and remote stop control.

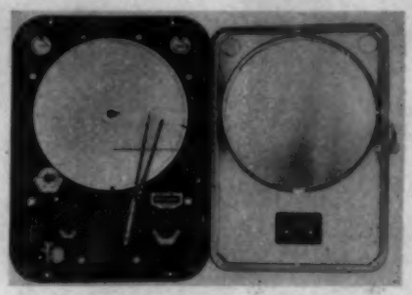
For portability, entire unit is mounted on a skid-type base, equipped with 5-inch wheels. When the unit is in use the wheels are raised from the ground, preventing creeping. According to the maker, the equipment is proving unusually valuable in airplane factories, and around airports for starting motors as well as charging batteries.

Air-Operated Controller

Bristol Co., Waterbury, Conn., is now offering on the market a new air-operated automatic control instrument known as a convertible free-vane controller. It is for automatically controlling temperature (up to 3600 degrees Fahr.) flow, liquid level, pressure, draft humidity, pH value, and time program.

The controller is reported to operate on the same basic free-vane principle as that used in previous models offered by the company. In the new type, a number of design refinements have been incorporated. These simplify the instrument and make it more convenient to service, the company states.

The new instrument also is designed so the user can convert from one type of control system to another. It is be-



ing offered in the following types: Monoset (on and off), ampliset (throttling), preset, reset, and magniset. Adjustments for fitting controller to requirements of the process are located on dial board above chart.

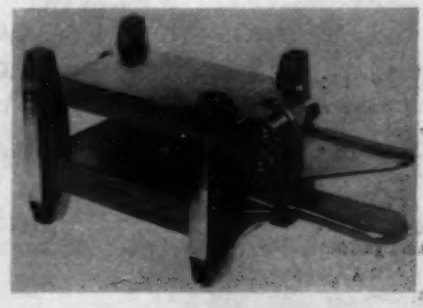
Glass Gages

Turner Gauge Grinding Co., Ferndale, Mich., is now offering a line of glass gages to its line of precision gages. These, the company states, range in size from ⅜ to 2¼ inches in diameter—and additional sizes are to be available when molds are completed.

Features of the gages are: They are not subject to corrosion; storage greasing eliminated; scratches and slight chipping on glass neither burr glass gages nor change their gaging functions; and the use of glass will teach inspectors to handle gages carefully.

Drill Jig Unit

Earl C. Parkhurst, 751 East Stepney place, Inglewood, Calif., is offering a new type Parlec drill jig unit said to permit the toolmaker or driller to get



into operation many hours sooner than otherwise. Its simplicity of design, only three castings and four pins, and a special quick opening and locking device,

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★ ★ ★ If you need sand castings in a hurry we can help. Our modern foundry can be placed at your service immediately for the manufacture of brass or other copper base alloy sand castings.
Ample capacity and the latest equipment PLUS experienced men who have the "know how" for the production of close tolerance work will assure you of uniform high quality castings with close grain structure.
We can furnish castings rough, machined, polished or plated. Our own Tool Room and Pattern Shop are ready to turn out any necessary tools or patterns if your job is in the blueprint stage. We manufacture a standard line of valve bodies of all kinds—STREAMLINE pipe fittings for heating, air conditioning, water works, plumbing and refrigeration use—OR TO YOUR OWN SPECIFICATIONS.
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CONTINUOUS BILLET HEATING
Oil fired, with hydraulic pusher and automatic temperature and pressure control, this R-S Continuous Billet Heating Furnace is highly satisfactory from every viewpoint. It reveals the degree of thoroughness of R-S Engineers which, after all, is the basis of every successful furnace installation.
You can depend on R-S custom-built or standard-rated furnaces of any size or type—all are engineered with the idea of "not how many but how well." Surprisingly fast deliveries, too.
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*Write for the R-S Car-Hearth Bulletin No. 68-F or information on any type of furnace in which you are interested.
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ANNEALING CONVEYOR
CONVECTION FORGING METAL MELTING
ROTARY HEARTH CONTINUOUS CAR HEARTH
SALT BATH PLATE AND ANGLE HEATING
BUY WAR BONDS

is instrumental in saving time in production drilling. The locking device also acts as a handle during drilling, adding materially to its ease of operation. The drill jig is being offered in seven standard sizes—1½ x 2 inches, 3 x 3½ inches, 3½ x 5¾ inches, 6 x 6 inches, 5 x 10 inches, 1½ x 6 inches and 3 x 11 inches.

Miller and Jig Borer

Industrial Tool & Die Works Inc., Minneapolis, announces a new 0-9 combination vertical miller and jig borer which with its range of spindle speeds from 300 to 3800, handles metals from steel to aluminum at correct speeds.

The machine has a fast hand and worm feed to the spindle. Feed adjustments are made by a hand wheel located

on the left side of the machine. Table of the unit can be fed either manually or by power. It has four feeds—¼, ½, ¾ and 1⅛.

Head of the miller swivels 180 degrees. Vertical spindle is driven by an independent ½-horsepower motor. The cutter spindle of the unit is mounted in a movable steel quill fitted in the vertical spindle head. Quick clamping of quill in any position is accomplished by a hand lever. This is fitted with an adjustable limiting stop for repeated accurate positioning of the cutter.

Checking Recorder

Michigan Tool Co., 7171 East McNichols road, Detroit, announces a new model B automatic checking recorder for use with sine-line lead and involute checkers. It is said to make permanent chart records of involute tooth forms and leads. Once installed, however, it

TAYLOR-WILSON
Hydraulic
Tube Testing Machine

for Testing Tubes
at pressures from 500 pounds to 7500 pounds per square inch

The Taylor-Wilson Hydraulic Tube Testing Machine—made in various sizes and types—is speeding vital war production throughout the steel industry. This machine is of rugged construction, occupies minimum floor space and is capable of continuous high speed production at low cost of operation. Each machine accommodates a large range of different tube diameters.

IMPORTANT FEATURES INCLUDE—

Ease of changing from minimum to maximum pressures.

Wide range of sealing pressures, avoiding tendency to buckle tube, thus eliminating excessive pressure on sealing packings.

Minimum time in changing for tubes of different diameters and lengths.

Machine is complete with hydraulic system. User need supply only foundations and connect electric service line.

Further information upon request

We also manufacture Straightening, Burnishing, and Sizing Machines, Tube Cutting-Off Machines, Galvanizing equipment for pipe, Small Seamless Tube Mills, Butt Weld Pipe Mills, and a complete line of equipment for the finishing of pipe.

TAYLOR-WILSON MFG CO.
15 Thomson Ave., McKees Rocks, Pa.
PITTSBURGH DISTRICT

One Source of Carbine Fire Power

These carbine parts (enlarged) are just a few of thousands of wire mill products for war uses.

KEYSTONE Wire

The 30-caliber M-1 carbine, now being turned out in thousands, multiplies many-fold the firing effectiveness of officers, specialists and gunners.

Notice, in this one weapon, the many parts that come direct from wire mill production. It is typical of hundreds of war items that are made from Keystone wire.

Meanwhile, every single pound of steel that can be *spared* is going into *most essential* civilian items.

KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE

can be applied to a variety of miscellaneous checking operations. It can be utilized to record variations in dimensions of thread forms, to surface checking with parallels and to many other checking operations wherein a precise record of dimensions is desired.

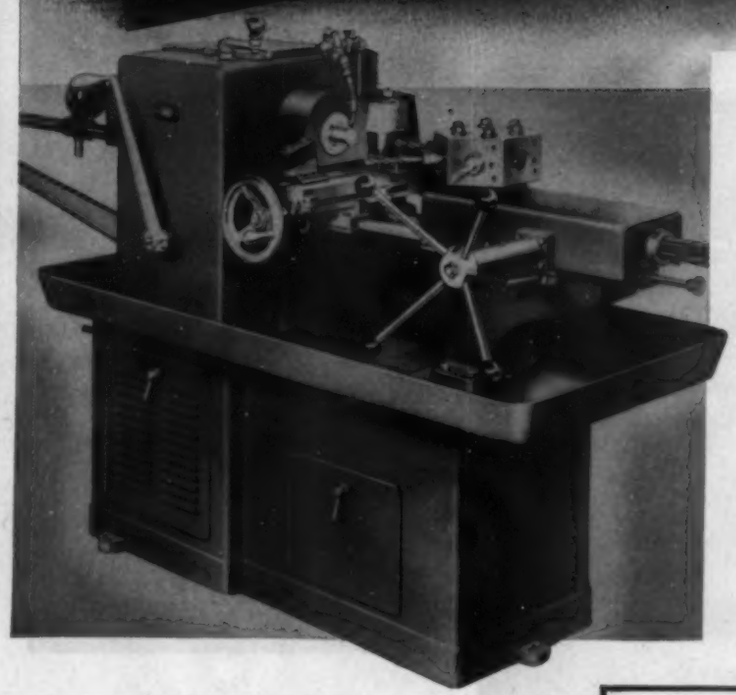
Operation of the recorder is based upon the use of synchronous devices. One is located in the recorder and another installed on a bracket in the base of the gear checker, or other type of measuring device. Motion imparted to the checker is automatically and accurately multiplied and duplicated in the recorder through electrical connections between the two units. Two methods of attaching the recorder to the measuring device or gear checker are available.

The chart drive may either be coupled in synchronism with the moving spindle or table of the measuring device, or it may be driven independently by means of a separate synchronous motor at predetermined speeds. When the recorder is used in conjunction with sine-line checking equipment, the synchronous device in the checker is connected with the sine-bar table. The motor in the recorder is connected with the chart drive. Travel of the chart in synchronism is then such that 1 inch of chart movement is equivalent to 4 degrees of rotation of the work-carrying spindle. When the independent synchronous motor is used to drive the chart, two speeds are provided—¼ and ½-inch per second. Change to either speed is made by a speed-control lever. Movement of the electrically operated indicator pen on the chart is magnified in the ratio of one ten-thousandth inch to one-eighth inch.

SIMPLICITY

of the Oster No. 601 RAPIDUCTION LATHE

Speeds Training of New Operators



Certainly you can't turn new operators loose on complicated machines. But you CAN relieve the pressure on their highly trained operators by diverting a wide variety of small diameter bar and chucking jobs to Oster No. 601 "RAPIDUCTION" Lathes.

This SIMPLIFIED machine is easy for the beginner to understand and operate efficiently after a short training period.

Ample proof of that statement is available. For example, one manufacturer has 139 Oster No. 601 Lathes operated mostly by people without prior machine shop experience.

For quick response to your request for complete details on the Oster No. 601 "RAPIDUCTION" Lathe, use convenient form below*.

No Time Out to Celebrate Our 50th ANNIVERSARY 1893-1943

OSTER

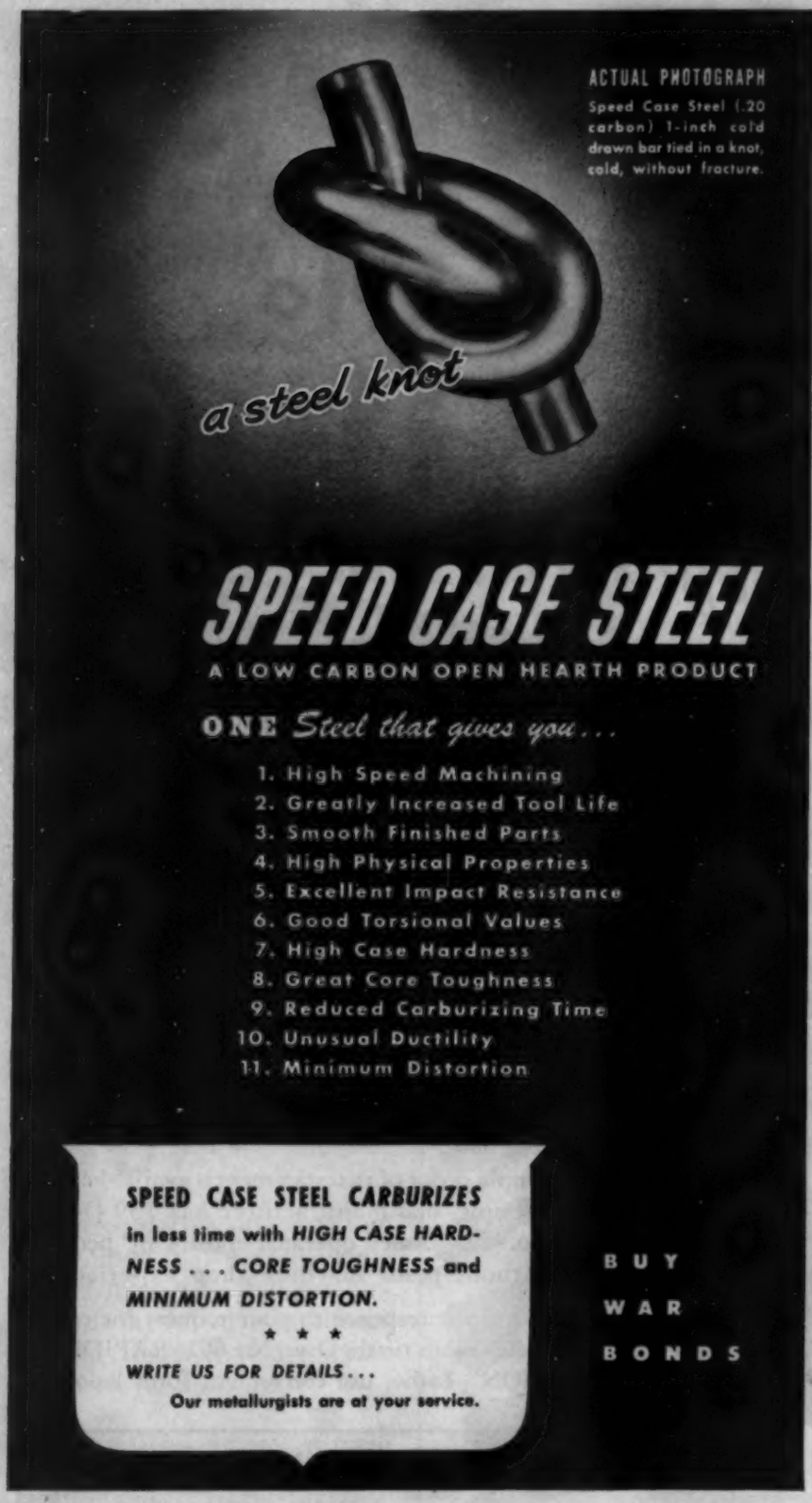
THE OSTER MFG. CO., 2037 E. 61st ST., CLEVELAND, OHIO, U. S. A.

*O. K. Oster. We're interested in the No. 601 machine. ☐ Send Catalog No. 601. ☐ Ask your nearest distributor to see us at once. (Check either or both of above requests.)

NAME_____

ADDRESS_____

CITY_____ STATE_____


ACTUAL PHOTOGRAPH
Speed Case Steel (.20 carbon) 1-inch cold drawn bar tied in a knot, cold, without fracture.
a steel knot
SPEED CASE STEEL
A LOW CARBON OPEN HEARTH PRODUCT
ONE Steel that gives you...
1. High Speed Machining
2. Greatly Increased Tool Life
3. Smooth Finished Parts
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6. Good Torsional Values
7. High Case Hardness
8. Great Core Toughness
9. Reduced Carburizing Time
10. Unusual Ductility
11. Minimum Distortion
SPEED CASE STEEL CARBURIZES in less time with HIGH CASE HARDNESS . . . CORE TOUGHNESS and MINIMUM DISTORTION.
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MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

Overall width of chart paper is such that dimensional variations up to 0.002-inch either side (plus or minus) of a central 0 line can be recorded. Three switches are mounted on the control panel of the recorder. Switch at left selects the driving method. At the top of the machine on the right is the control lever for selecting the drive speeds when the chart is driven by the constant speed motor. The center switch on the control panel controls the movement of the pen. The righthand switch controls the direction of chart travel relative to that of the part being checked. On the top of the machine to the left of the control panel is a master switch, which controls the power supply. Entire unit is mounted on rubber-tired casters for easy portability.

Bench Type Tapper

Bakewell Mfg. Co., 2427 East Fourteenth street, Los Angeles, is offering a new No. 0 tapper, a bench model built for tapping class 3, 4, and 5 gage fit threads in any material with one stroke of the tap. Its capacity is from 0-80 to 8/32 in steels and up to 10/24 in aluminum and other soft materials.

Equipped with a super-sensitive solenoid actuated clutch which can be regulated by the operator for a torsional resistance of the tap in the material, it is claimed the machine will make possible the securing of at least 300 per cent greater tap wear.

As in other models, this newest addition is constructed with electrically-operated brass guide fingers which engage the lead screw during the complete cycle of the stroke. The lead screw has a hobbing portion so threads of the

There's a quartet of gremlins with a particular fondness for cutting tools. Their names are Friction, Heat, Power Thief and Tool Wear. Anyone of them can stall production.

There's an easy way to help kill 'em off . . . and to keep them from coming back again.

Simply specify Chillo Cutting Oils. These famous Cities Service coolants deliver speed, fine finish, and longer tool life. They are particularly appropriate now, for they were especially designed to fit the most exacting requirements of wartime production.

Get in touch with your nearest Cities Service office today. A Cities Service lubrication engineer will confer with you on the needs of your particular machining operations. No obligation, of course.

For a free, informative booklet on Metal Machining Fluids write to Room 1378, Sixty Wall Tower, New York, N. Y.

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For Wire

Today's PAGE wire production goes wherever the needs of war direct it—as it should be. . . . But you will find it good business to discuss with PAGE now—or any time—your plans for after-war production.

GENERAL WIRE
Spring Wire, Bond Wire, Telephone Wire, etc.

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Stainless Steel. Carbon Steel. Half-round, oval, triangle, hexagon, octagon, flat, keystone, etc. Diameters to 3/8". End section areas to .250 sq. inch.

WELDING WIRE
Stainless Steel in analyses and diameters of such broad range that it is easy to choose from them the correct electrode for any Stainless Steel welding. A complete line of electrodes for welding all other steels. PAGE welding electrodes are handled by your local PAGE Distributor.

Wire always has been the business of PAGE. You will find us well equipped to work out your plans with you.

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In Business for Your Safety

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BRIDGEPORT • CONNECTICUT

screw may be chased into brass guide fingers which engage with the lead screw by means of a solenoid actuated spring tension. The lead screw is changed with each change of tap and new corresponding threads are hobbed into the fingers.

Carbide Tool Grinder

Thomas Prosser & Son, 120 Wall street, New York, announces a new model AA floor type carbide grinder featuring a new heavy base, drum type on-off-reverse switch, heavier tables, storage compartment for wheels and tools, and other improvements.

The machine provides for rapid removal of metal when roughing, together with accurate finishing of all single-point tools. It allows the use of either silicon carbide or diamond wheels for grinding

carbide, or aluminum oxide wheels for grinding stellite or high speed steel.

Among the features of the grinder is the simple, positive, quick-acting indexing device permitting instant setting of the table to the desired angle—eliminating unnecessary loss of time and motion. The table stays "put" at the angle to which it is set.

The machine carries oversize 7-inch wheels, the location of the hubs on the shaft being adjustable to compensate for wheel wear. The face of the wheel can be kept close to the edge of the table. Spindles run in precision ball bearings provided with adequate dust seals.

Armor Plate Grinder

Vonnegut-Moulder Corp., 1819 Madison avenue, Indianapolis, reports a new type GRC armor plate grinder said to offer a quick solution to the problem of grinding straight-line, square and bev-

FOR QUICK ACTION

● Our wartime strategy of making wheels only 3" in diameter and under is approved and endorsed by W P B. We make a 24-hour a day job of it. All vitally needed wheels are shipped promptly. There is no let-up. Our central location gives us a head start on deliveries.

*Half a century of specialization has established our reputation as the Small Wheel People of the Country.

Custom Built Wheels, just the right wheels for your particular job, no matter how precise or difficult it is.

The moment we have your grinding problem, it's turned over to abrasive engineers who make up the wheels that do your job better and faster.

Years of research and Specialized* experience are behind each Chicago Grinding Wheel.

You can depend on prompt deliveries. GET IN TOUCH WITH US!

TEST WHEEL—Tell us the kind of job and size wheel you need. We'll be glad to send one without charge.

CHICAGO WHEEL & MFG. CO.

1101 W. Monroe St. Dept. S Chicago, Ill.

Send Catalog. Interested in S 5

☐ Grinding Wheels ☐ Mounted Wheels ☐Send Test Wheel. Size_____

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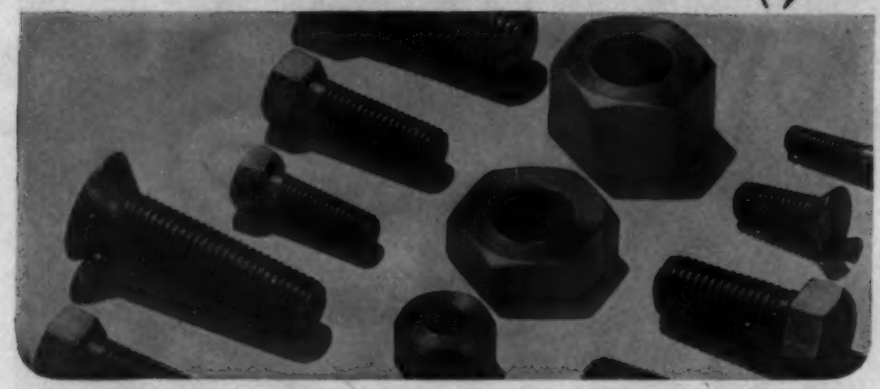
Women like **TRIPLEX QUALITY**



SEMI-FINISHED NUTS AND CAP SCREWS

Because TRIPLEX nuts catch on quickly with their free-running threads. That's why! Less work—easier on feminine fingers. Clean Triplex cap screws also turn smoothly and easily. Heads fit well —look neat. No wonder thousands of women in war plants recognize TRIPLEX quality.

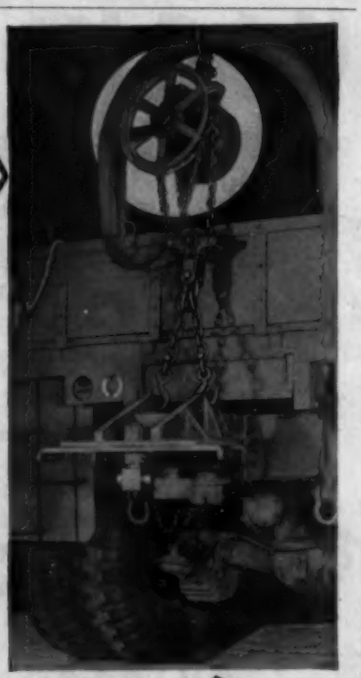
Mail us your "sixty four dollar" question on service today.

TRIPLEX SCREW COMPANY · 5341 GRANT AVENUE · CLEVELAND, OHIO

TRIPLEX® THREADED FASTENERS

CAP AND SET SCREWS · BOLTS, NUTS AND RIVETS

The Hoist That Can "Take" Real Punishment



● Out on the battle fronts, as well as along production lines, Reading Chain Hoists are staying on the job 24 hours a day. In many plants where minutes cannot be spared for "down time"—Reading Chain and Electric Hoists are helping to keep production schedules ahead of the clock.

When you have a tough materials handling problem to solve, rely on Reading's ability to design hoists that speed output by reducing maintenance troubles. And for printed help with your specific problems, ask for "*Modern Materials Handling Magic*". It tells how to specify special electric hoist equipment . . . at *standard equipment* cost.

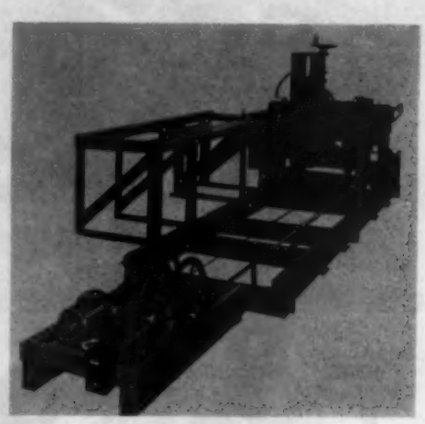
Reading Chain & Block Corp., 2102 Adams Street, Reading, Pa.

READING CHAIN HOISTS-ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

eled ends and edges of certain hardened armor plate patterns. Its design also permits handling changes in dimensional specifications without necessity of long delay for new patterns.

The grinder, offered with a 10-inch diameter segmental abrasive chuck driven by a 7½-horsepower 1800-revolutions per minute motor or a 14-inch chuck driven by a 10-horsepower motor at 1200 revolutions per minute, features a 90 degree angular adjustment, 45 degrees below and 45 degrees above horizontal, with adequate vertical and horizontal adjustment for angular setting.

Each of the three adjustments is made within its respective hand-operated screw. Angular and vertical positions are secured with positive locking clamps, and end adjustment of the motor unit is held to position through



spring pressure friction to permit continuous feeding of wheel into the work.

Frame of the grinding unit is supported upon four grooved wheels which roll upon a pair of round steel tracks mounted upon a pair of I-beams. The supporting beams are tied to each other and also to the work table by a series of welded braces.

The grinding unit is drawn back and forth along the track by a power feed reversing cable drive. The cable is driven by a ½-horsepower 1800-revolutions per minute motor. The length of travel is controlled by contact of the grinding unit with adjustable throw collars upon a shifting rod extending the length of the tracks.

The machine's three standard rates of feed are 4, 6½ and 8 feet per minute. The grinding and feed motors are controlled through push buttons and magnetic contactors with thermal overload relays and undervoltage release.

Fume Exhauster

Chelsea Fan & Blower Co. Inc., 1206 Grove street, Irvington, N. J., is offering a new and improved fume exhauster which can be used in shipholds, welding

rooms, tunnels, vaults, basements, etc. Its function is to prevent fumes, gases, dust, filings and grinding compounds from coming in contact with the motor.

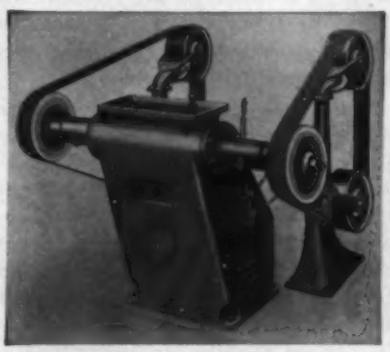
The newly developed centrifugal type blower wheel incorporated in the unit is

of ⅛-inch steel. The 3-horsepower motor is tested to an overload capacity to meet all the rough usages to which a blower of this type is subjected. Frame work is welded into a strong heavy unit with handles for carrying. Adapters are interchangeable and can be used for suction or blowing as desired.

Backstand Idler

Jones Engineering Co., Ellwood City, Pa., is offering a new No. 120 abrasive belt backstand idler—a floor-type model especially designed for crowded grinding and polishing departments. It can be quickly and easily connected to any regular grinding or polishing lathe by even the most inexperienced workman, it is said.

Due to a unique vertical arrangement of pulleys, the new model takes a minimum of floor space. Thus, grinding lathes set too close to the wall for use with other types of backstands can be equipped with these new idlers without



requiring more than a few extra feet of floor space.

Other features of the idler include conveniently located controls at the front of the machine, adjustable spring belt tightening and positive screw belt aligning. The backstand will take any belt size up to 6 inches wide, is designed for belt speeds up to 10,000 surface feet per minute and is built so simple dust collecting hoods can easily be installed.

This Is What Happens When Sweating Robs the Body of Salt . . .

Keep This Arm On The Job!

Heat-Fag attacks workers who don't replace the body salt lost through sweating. Heat-Fag undermines vitality — destroys the will to work —makes men careless. And, in many cases, it is the direct cause of lost man-hours, absenteeism and accidents.

Heat-Fag is the all-out, unseen enemy of production. Thousands, yes, millions of precious man-hours can be lost through this insidious force that saps men's strength — lowers their efficiency — wears them down before the shift is over. Salt sweated from the body must be replaced — or Heat-Fag takes its toll.

In all leading industrial plants — wherever men sweat and do hot work — salt tablets are a "must".

MORTON'S Heat-Fag SALT TABLETS

QUICK DISSOLVING
(Less than 30 seconds)
This is how a Morton Salt Tablet looks when magnified. See how soft and porous it is inside. When swallowed with a drink of water, it dissolves in less than 30 seconds

Case of 9000, 10-grain Salt Tablets, $2.60
Salt-Dextrose Tablets case of 9000, $3.15

Place MORTON'S DISPENSERS at all Drinking Fountains.
They deliver salt tablets, one at a time, quickly, cleanly — no waste. Sanitary, easily filled, durable.
500 Tablet size - $3.25
1000 Tablet size - $4.00

Order from your distributor or directly from this advertisement . . . Write for free folder.

MORTON SALT COMPANY • CHICAGO, ILLINOIS

Deep-drawing made it light and strong enough to fly

This cylinder, a reservoir of hydraulic energy for aircraft use, is another example of the way in which the Hackney Deep-Drawing Process helps manufacturers strengthen and reduce the weight of parts simultaneously.

Hydraulic energy to feather propellers, operate landing gear, flaps, etc., requires accumulators which are light in weight, yet are strong enough to withstand high internal pressures.

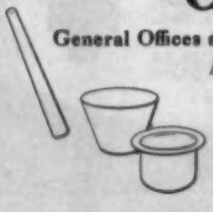
Hackney engineers co-operating with the accumulator manufacturer developed a cylinder to meet the exacting specifications. Unnecessary weight was eliminated and uniform sidewall thickness was assured by cold drawing. Ample strength was assured by electrically controlled heat-treating.

In addition to successfully meeting the weight-strength requirements, the Hackney Deep-Drawing Process makes important savings in time and materials as no machining is required for weight reduction in producing these improved products.

If you have a problem which deep-drawing might solve, let Hackney's engineers help you. Their experience may enable you to overcome manufacturing difficulties, meet war material limitations or effect product improvements. Write for details.

Pressed Steel Tank Company

General Offices and Factory · 1461 SOUTH 66th STREET
Milwaukee, Wisconsin



DEEP-DRAWN
SHAPES AND SHELLS

Ships in Indiana

(*Continued from Page* 104)

feet. The hull is supported horizontally as it moves down the skids on 13 steel cradles, the movement being controlled by a set of winches located in a concrete gallery at the head of the launching ways. The gallery top is at yard elevation and does not obstruct operations.

After launching, these ships proceed to three outfitting piers, equipped with all utilities, where electrical, pipe and other combat fitting work completes the job. These ships are launched from 50 to 80 per cent complete. When delivered to the Navy at Evansville, they are complete.

Frank Harrison, general manager of Missouri Valley Bridge & Iron Co., speaking of construction methods, said: "The yard here is only part of the job. Some 15 subcontractors with a 200-mile radius prefabricate a large percentage of the hull. Our organization has been able to bring many engineering ideas to this task, old in other practices, new in shipbuilding. After all, these ships may have a few more curves, but they are essentially just like a building. Of course, we can bend or cut steel any way we wish.

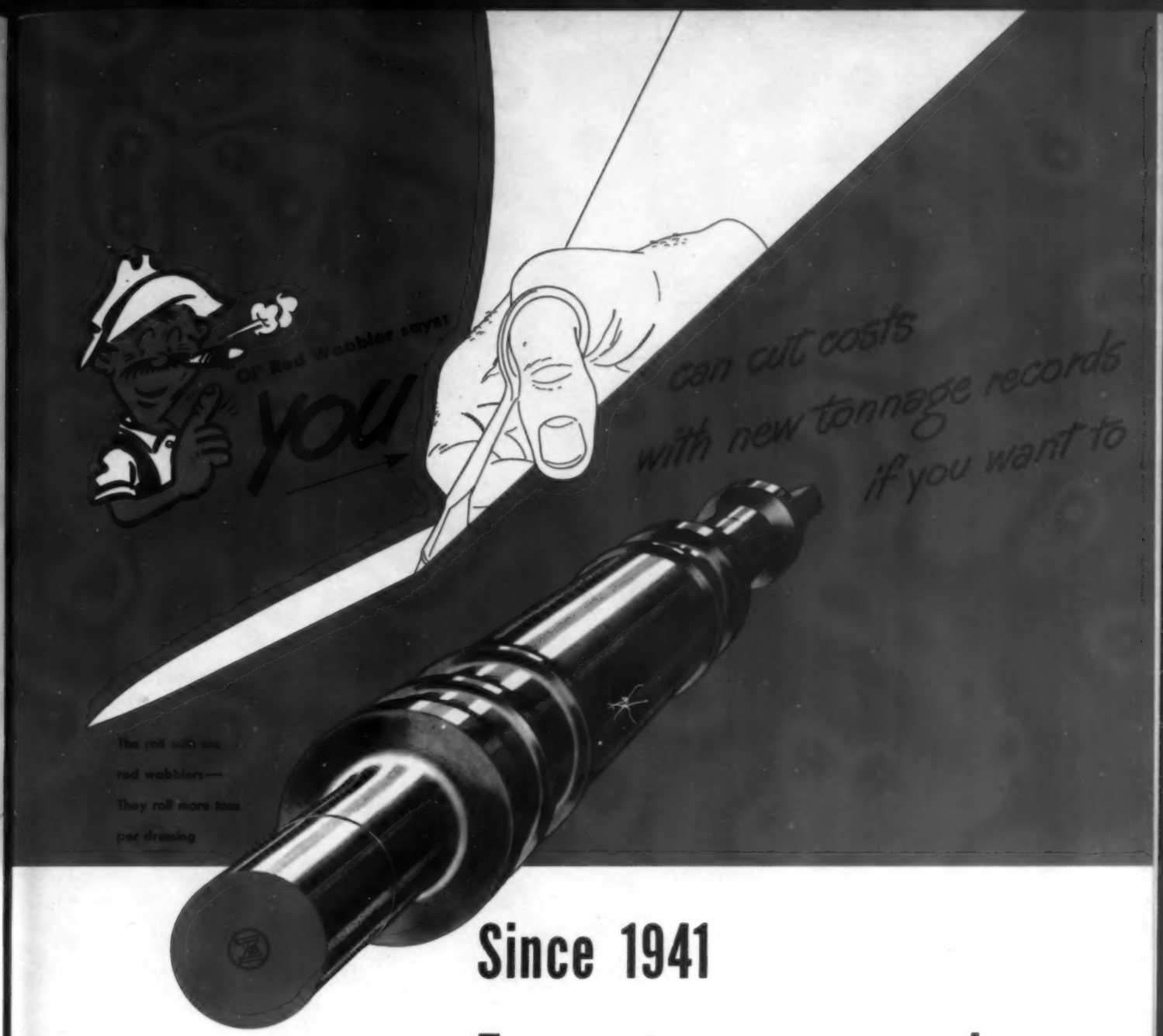
"The flat design of them makes prefabrication at distant points feasible, limited only by our ability to transport. Aside from the warehouses in the yard, others are scattered over the city. Yet material movement is so smoothly scheduled that little time is wasted between arrival of a subassembly and the moment when it is swung into position for tackwelding."

Templets were made for each piece of steel involved in ship construction. These were checked back against loft lines in every instance. Mold loft reference is constantly available.

Plate sizes are issued to subcontractors, and much work is received finished to size. The entire structure is divided into assemblies as large as the big cranes can handle. The bottom plating and inner bottom weldments are set on the building ways, forming a foundation for the vessel. Then the varied bulkheads as well as the prefabricated bilge bow, stern elevation, transverse sections are swung into position, providing attaching points for side shell plating and framing.

Light, sectional, movable scaffolding adds to the speed of final assembly. There are more than 100 subassemblies and some 90 odd sequences in the hull erection.

Some subassemblies come from fabricators outside Evansville by truck and rail, also by river barge. For subas-



Since 1941

7 new tonnage records

with Technalloy Blooming Mill Rolls

Other Mackintosh-Hemphill Products:

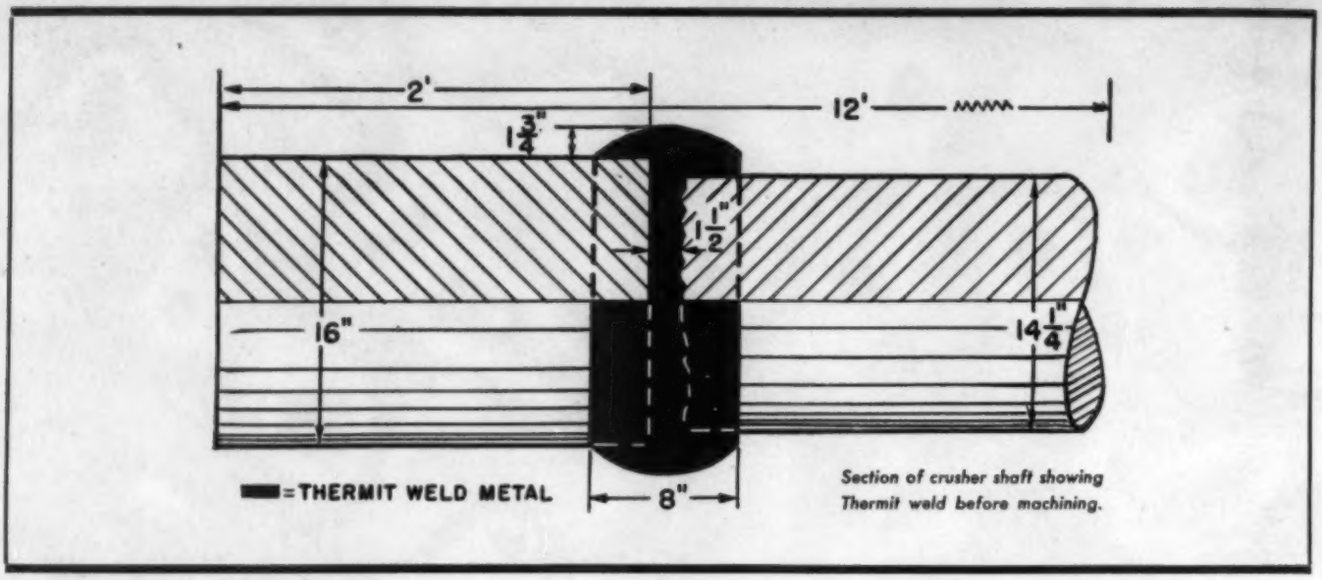
Rolling Machinery . . . Shape Straighteners . . . Strip Coilers . . . Shears . . . Levellers . . . Pinions . . . Special Equipment . . . Iron-Steel Castings . . . The NEW Abramsen Straightener . . . Improved Johnston Patented Corrugated Cinder Pots and Supports . . . Heavy Duty Engine Lathes.

In seven mills, new tonnage records were set with Mackintosh-Hemphill Technalloy Blooming Mill Rolls, thus reducing costs. In two of these mills, the new tonnage records established were double those of the best previous performance.

M-H Technalloy Rolls are made of enriched true alloy steel; they are especially heat treated to produce the required hardness of the body surface and are tempered so as to toughen them to resist spalling and crumbling under pressure. The journals are tough and strong and well able to withstand the imposed stresses.

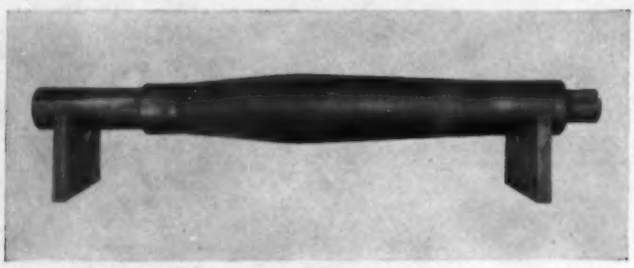
Save money and establish new tonnage records. Specify M-H Technalloy Rolls.

MACKINTOSH-HEMPHILL CO., Pittsburgh and Midland, Pa.



Section of crusher shaft showing Thermit weld before machining.

"IRREPLACEABLE" CRUSHER SHAFT RESTORED by THERMIT WELDING



Repaired crusher shaft, after machining.

Like many other heavy equipment and machine parts today, a broken 12' long, 5-ton gyratory crusher shaft in an Arizona smelting plant was not replaceable within a reasonable length of time. When the shaft broke two feet from the end, only three days were required to weld a new 16" billet in the place of the broken part. As soon as the excess metal was machined off, the shaft was restored to service . . . possible weeks of inactivity for that particular crusher and a serious curtailment of production were avoided.

Thermit welding can often be employed where no other process or method of repair would be practicable. The welds—sound throughout—are often stronger and tougher than the parts welded.

Because of the ease and speed with which Thermit welds can be made, their dependability and low cost—usually ranging between 20% and 50% of the cost of making or purchasing a new part and installing it—many industries are regular users of Thermit welding.

Besides being used for repairing heavy parts, Thermit welding is employed for fabrication, uniting small castings, forgings, or flame-cut shapes into a single, durable unit. The Thermit process is thus frequently able to relieve overloaded casting or forging facilities.

For further information send today for booklet, "Thermit Welding."

METAL & THERMIT CORPORATION

Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

120 BROADWAY, NEW YORK

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semblies too large to transport, the steel comes from three rail spurs to platforms for subassembly construction right at the building. The larger subassemblies are erected in the yard and lifted into position by the huge cranes. Temporary portable shelters form the cribs for construction of these large sections, such as bows and sterns. These subassemblies are mounted on skids. Ingenious jigs and fixtures have been designed to hold them into welding position. They are tipped upside down for downward welding and are positioned at any angle by the cranes.

Part of the yard equipment is listed in Table I.

These specialized fighting craft are erected on buildings ways which parallel the water. They are set on dollies which travel on railroad rails and are moved to the transfer area just as one would move a house. These dollies and their hydraulic decks are special Missouri Valley Bridge & Iron Co. design.

In the transfer area, the dollies are jacked up hydraulically and their wheels are turned 90 degrees to provide right angle travel, carrying the ships to the launching ways. There are 26 dollies to the ship, 13 on each side. At launching time, each ship is pulled on the tracks of the launching cradles, the boat is jacked and wedged on the cradles, the dollies are pulled away leaving the boat firmly cradled.

Cables from the machinery gallery pass around 13 sheaves to give a 90 degree pull and are hooked to the 13 cradles. After cables are tightened, nuts are released on the permanent structure. The winches are then operated and under "controlled launching", barely moving, the ship is gentled into the outboard portion of the launching way.

The Missouri Valley Bridge & Iron Co. training school has 52 instructors in welding, cutting, burning, chipping. It uses additional training instructors in shipbuilding, blueprint reading, shipfitting marine piping, marine wiring, chipping and caulking, survey and measurements, departmental training. They are doing an excellent job of teaching these skills to green workers, most of whom have been recruited from Indiana, Kentucky, Tennessee.

The thousands of workers employed are all new except a few key men and thus have had to be trained. This training is done in the yard and also in a large Evansville factory building revamped for the purpose. Flat, vertical, horizontal, overhead welding of plate as well as training in arc and acetylene welding and silver soldering of pipe are given. Trainees must pass Navy ship welding tests.

Large use is made of training films;

The pace of production

is more efficiently governed when the flow of

supplies to and from storage is

regulated by **TOWMOTOR**

THE 24-HOUR ONE-MAN-GANG

TOWMOTOR CORPORATION • 1223 E. 152 ND STREET, CLEVELAND

STRAIGHT—GAS POWERED INDUSTRIAL TRUCKS EXCLUSIVELY—SINCE 1919

particularly of arc welding and in relation to special ship construction, such as preparing and setting keel blocks, bottom and cradle, laying off boundary, stiffeners, water line and buttock line, getting a traverse water-tight bulkhead into the hull. The Evansville shipyard has produced two color films "M.V.B. & I. Layout" and "Erection and Sequence" on 16-millimeter film with sound. Altogether six films on welding are used, shown at the school, away from work and on the man's own time. Actual experience in cutting and welding is given in these classes—26,870 useful shipfitting items having already been made from scrap steel, including such items as wedges, screw dogs, pull downs, shims and C-clamps. They even built the fire truck for the yard.

Most of the welding is straight line. Overhead welding is largely limited by the ability of the jigs, fixtures and cranes to tip cross sections into a favorable welding position. Details of the welded construction are restricted but generally resemble those described in catalogs on "Welded Steel Hulls" by Dravo Corp., Pittsburgh. Such Dravo construction details as rounded welded corners, serrated framings, deck and bilge transverses have been adapted.

Many complicated constructions are neatly shown to workers in unique Lucite plastic models, scaled ⅜-inch to the foot, help workers gain three-dimension training. Lucite models were made at the International Steel Co. by high school boys used to making model airplanes.

Protection System

(*Continued from Page* 118)

complete stoppage. Essential machinery and utilities—water, gas, and electrical equipment, switchboards, and transformers—may be protected by walls. An overhead roof of a ¼-inch steel plate, properly supported, will protect against light incendiary bombs. Underground utilties often sucer serious damage from earth shock and ensuing movement.

Protective Concealment: This program is under direction of the War Department. Planning is the most important step here. The following may be considered in protective concealment: Planting material (to minimize the straightness of lines and regularity of shadows); overhead screens and appendages (to get rid of shapes, outlines, and shadows); smoke screens.

Blackouts: Next to proper air raid protection organization, unquestionably the blackout is the most important passive protection measure to be taken at night.

The object of the blackout is to control illumination so as to prevent it, or any reflection, from being seen by the enemy above. This is done by extinguishing lights or by effective screening. Blackout must be done speedily and with efficiency.

Methods of Blackout: Extinguishing all exterior lights, reducing outside lighting to acceptable low intensities or shutting down of light-producing exterior and interior operations; blacking out or obscuring of all openings through which light may be reflected or seen from above. This includes reducing the intensity of interior lighting and of the possible use of the low radiation colors—white and orange.

Screen construction, skylights, fireglass surfaces, light locks, emergency exits, all present grave individual problems.

There are many industrial processes in steel mills, foundries, sugar refineries, etc., which produce a glow, reflected light or flames which are visible outside the plant even during a blockout. These light menaces should be controlled and the glow prevented. Examples: Blast furnaces, bessemer converters, open-

FORGING ALUMINUM
Calls for our specialized knowledge of furnaces

Morrison Engineered and Built Continuous Heat-Treating Furnace.

Because we have designed and built so much of the furnace equipment in use today in plants successfully forging, heat-treating and aging aluminum, we can honestly claim the title "Furnace Headquarters" when aluminum is the work and heating is the problem.

Pioneers in convection recirculating heating, we quickly recognized its many advantages for the heating of the light metals and their alloys. On these basic principles, we have designed furnaces that positively can not overheat the work—in sizes ranging from portable types to stationary large-production units.

If you are considering the production of *light metal* forgings—if you are hesitating because correct heating is a problem in your mind—Morrison will gladly help you. For quick action write, 'phone or wire.

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Associate Companies: MORRISON ENGINEERING OF CANADA, LTD. CARRIER ENGINEERING CO. LTD.

hearth and reverbatory furnaces, cupolas, ingot-stripping and ingot-soaking pits, rolling mills, bee-hive coke ovens, by-product coke ovens.

Glass: In preparing for blackout, some glazed openings may be obscured permanently but others must be left undisturbed so that daylight may enter the building. At night it must be possible to obscure these "undisturbed" areas on short notice. During an explosion, glass creates a highly dangerous splinter hazard. The strength of glass, glass installation, glass protection against distant effects, all are individual problems.

One Final Word: Not only do air raids threaten American industry, but fire, sabotage, and industrial accidents do as well. Every week industrial accidents kill an average of 425 American workers, cripple or blind 2200 others, incapacitate more than 45,000, and lose for industry and the nation 6,000,000 man-days of essential war and civilian production. Comprehensive safety programs will reduce these losses.

Ventilation

(*Continued from Page* 122)

grees Fahr. which the cooling air had to pick up was equal to the weight of the wire per foot times the number of wires times the speed of the wire per minute times (1800-800 degrees) times the specific heat of iron. This is equivalent to the total weight of wire moving per minute times 1700 times the specific heat of iron. The number of cubic feet of air at 100 degrees Fahr. required to enter the cooling chamber was calculated as follows:

$$\frac{\text{B.t.u.'s per minute}}{0.075 \times \frac{(460+68)}{(460+100)} \times 0.25 \times (t_f - 100)} = \text{CFM}$$

where t_f is maximum temperature of air in the fan. In this case 700 degrees Fahr. was decided upon as the upper temperature limit.

The cubic feet of air leaving equals:

$$\text{CFM entering} \times \frac{(460+t_f)}{(460+100)}$$

In all the calculations appearing in this article, the number 460 is added to Fahrenheit temperatures to obtain absolute temperatures. A cubic foot of air changes its volume in direct proportion to its change in absolute temperature.

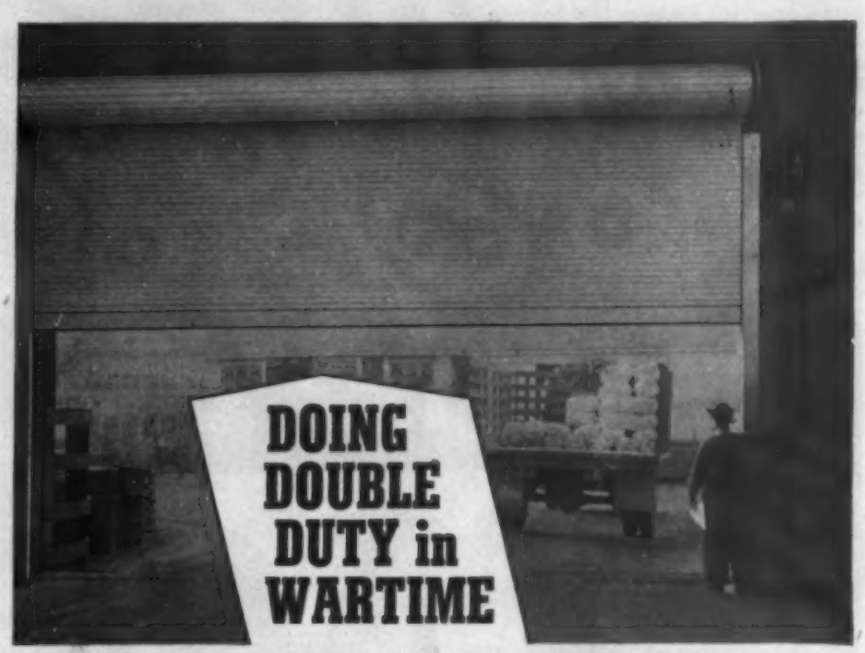
Another application in a steel mill near Chicago was made for the purpose of cooling a tunnel under a furnace where piping, wiring, and electrical equipment was located. The tunnel was rather long, and so much obstructing material was in the air-stream that the static pressure was 2 inches water gage for the specific volume. A 5-foot giant fan, inlet cone, base, and 40-horsepower motor and V-belt drive was furnished to handle 50,000 cubic feet per minute at 2 inches static pressure. The fan was axial flow type with nonoverloading power characteristic, and operated at 55 per cent mechanical efficiency. This mill decided on the axial flow type after their engineers learned that the same units, of larger size, were installed to ventilate the Chicago subway systems.

(*Concluded in next issue*)

Sweet Offers File For Product Designers

Information on materials, finishes, parts, techniques and work equipment is included in the new 1500-page "File for Product Designers" recently issued by Sweet's Catalog Service, Division of F. W. Dodge Corp., 119 West Fortieth street, New York.

The publication is said to have a wealth of information regarding forms, characteristics and performance of materials and equipment which will be incorporated in products of the future.



Kinnear Wood Rolling Doors

Offering the space-saving, *coiling upward action* and other operating advantages of the famous Kinnear *Steel* Rolling Doors, these rugged WOOD doors have piled up years of satisfactory service on various types of installations.

Now — in wartime — when every possible pound of steel must be saved — these time-tested WOOD doors are the perfect answer to every service door need, in buildings of every type!

Look at the advantages Kinnear WOOD Rolling Doors offer: Smooth, quick, easy operation . . . a rugged interlapping slat curtain that coils out of the way and out of reach of damage . . . maximum savings in floor, wall and ceiling space . . . full protection against wind and weather . . . choice of motor or manual control . . . neat, modern appearance . . . and maximum savings in war-vital steel. Kinnear Wood Rolling Doors are available now, in any size, for new construction or replacements. Write for details. The Kinnear Manufacturing Company, 1780-1800 Fields Avenue, Columbus, Ohio.

KINNEAR ROLLING DOORS

A SAVING WAY FOR DOORWAYS

LEWIN-MATHES Got the right answer at

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from ⅜" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

Get the right working pressure

★ Air operated equipment works best at the correct pressure for each job, and oftentimes the right working pressure is far less than full line pressure. Hannifin pressure regulating valves give you the most efficient working pressure with a turn of the adjusting screw. The exclusive piston-type design means sensitive, accurate control, and full-scale adjustment over the entire range from 150 lbs. down, to furnish any reduced operating pressure desired. Long valve stem travel gives large volumetric capacity, responding to varying operating needs with minimum restriction to flow. Hannifin pressure regulating valves are built in three standard sizes—⅜, ½, ¾ inch for use with initial compressed air pressures up to 150 lbs. Furnished complete with pressure gauge. Write for Bulletin 56-S.

HANNIFIN MANUFACTURING COMPANY
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HANNIFIN
Pressure Regulating
VALVES

Standard Sampling

(*Concluded from Page* 128)

—Applicable to large, massive sections, such as blooms, billets, slabs, rounds, squares, special shaped bar sections, etc. Chips are taken at any point midway between the outside and the center of the piece by drilling parallel to the axis. In cases where this method is not practicable, the piece may be drilled on the side, but chips are not taken until they represent the portion midway between the outside and the center. See Fig. 1.

Methods of Analysis: The methods of analysis commonly used are in accordance with the latest edition of *Methods of Chemical Analysis of Metals*, published by the American Society for Testing Materials, or the methods approved by the National Bureau of Standards.

Check analysis as used in the steel industry means an analysis of the metal after it has been rolled into various forms, and is either for the purpose of verifying the average composition of a melt or lot as represented by the ladle analysis, or to determine variations in the composition of a melt. It is not used, as the term might imply, for a duplicate determination made to confirm a previous result. The results of analyses made of samples taken from different locations in the same piece or taken from different pieces of a lot may differ from each other and from the ladle analysis due to segregation.

When check analyses are made of the material as furnished, the composition based on the average of all the separate determinations made must fall within the limits ordered. The separate determinations may vary from the ranges or limits ordered to the extent shown in Table I, except that the elements in any one melt may not vary both above and below the range or limits ordered.

Chipped Bearings Cause Tires to Wear Out

Chipped and worn wheel bearings cause premature failure of many truck and trailer tires and are mainly responsible for flat spots on the tires, according to Goodyear Tire & Rubber Co., Akron, O. This discovery was made on close inspection and studies of the tires used on more than 100 truck and trailer fleets.

According to Goodyear, in one fleet of 497 trailers, two barrels of bad bearings were found in 90 days. These caused 146 tires to wear out before they had yielded their maximum potential service.

All-Hydraulic Press

(*Continued from Page* 101)

To these we may add the desirability of obtaining a compact and self-contained unit. If possible, it should be free from the complications of steam supply, accumulator service, or any other gear which would increase the initial cost and remain to plague us with maintenance.

Obviously, we must have a base, four resistant columns to carry the thrust, and a head in which we may mount a cylinder of suitable dimensions, fitted with a ram. Provision must now be made for the flow of the selected fluid to the cylinder in the manner prescribed; for the retraction of the ram during the return stroke; and for the storage of the fluid as the ram rises and falls. Let us see how these basic specifications are met.

Oil has many advantages as the working fluid, inasmuch as it obviates any special provisions for lubrication of the main working parts and any anxieties about corrosion or rupture as a result of freezing.

Pressure Unit—Problem

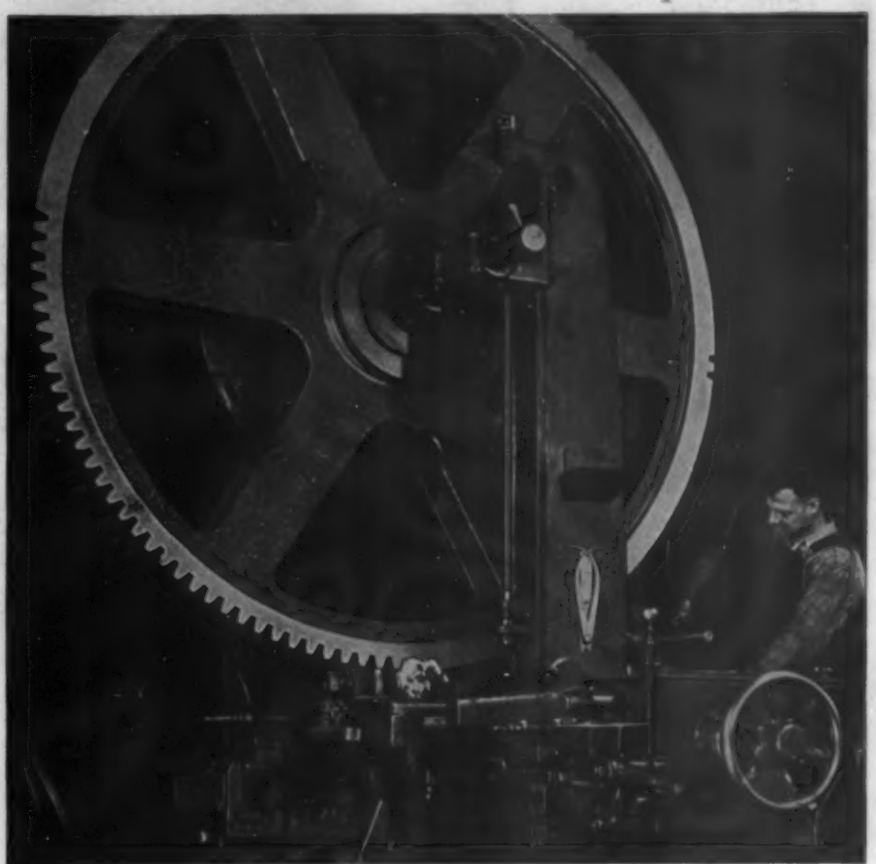
For compactness, the rather obvious situation for the storage tank is immediately above the cylinder. If we enlist the force of gravity, the ram may fall sufficiently fast for our purpose if we provide a large enough port through which oil may flow from the storage tank into the cylinder. Thereafter our major remaining problem is the selection of the most desirable form of pressure producing unit, designed to function immediately on contact of the ram with the job. Further, if such a unit is readily adapted to reversal of the direction of the flow of pressure fluid, the retraction of the ram is readily achieved by the provision of an annular, differential operating space.

Fig. 2 illustrates these arrangements diagrammatically. Surge valve 9 allows oil to flow rapidly either into or out of the main cylinder from the storage tank 10. The differential ram 1 with its long bearing guarantees accurate alignment. A radial piston type of eccentric pressure pump is capable of reversal under the impulse of the pilot piston of the servo-reversing control 4. The nonreturn ball valve 8 communicates with the pipe which feeds the annular space between the body of ram and cylinder and so permits the pump to deliver the difference in volume of oil required to fill the space above the ram and the annular space around it.

Note in Fig. 2 the absence of all packings, except the low pressure packing which seals the lower end of the cylinder; the almost entire absence of piping; and the promise which these features suggest of compactness in the complete assembly.

The surge valve 9 (Fig. 2) is the poppet type. On the advance of the ram, oil is sucked rapidly from the differential area of the main ram, thus controlling the rate of its descent under the action of gravity. The partial vacuum thus produced by the receding ram (since the volume of oil delivered by the pump is much less than that required to fill the main cylinder) causes the surge valve 9 to open, allowing oil from the surge tank 10 to prefill the main cylinder. Since the ram in its descent maintains a positive pressure in the differential space, the makeup ball valve 8 remains closed. This situation persists until the ram encounters the resistance of the work.

At this point the press commences the working portion of the stroke and the following events occur. First, the partial vacuum which kept the surge valve 9 open is destroyed and the surge valve closes, building up pressure instantly in the main cylinder. Thereafter the rate of progress of the ram is determined by the volume of oil delivered by the radial pump 3, supplied by the diminishing volume of the annular space surround-



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★ This gear is going to do a big, tough job on the industrial front . . . just one of many large gears made by Horsburgh & Scott in sizes up to 144 inches in diameter and 20,000 pounds weight. Their quality speaks louder than words.

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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

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The "B" stands for Bissett, of course, for it was Bissett service which made possible the prompt delivery of the bored shafts shown above. These 9 shafts—14 feet long with 7½" O.D. and 4" I.D. —were supplied to a war plant completely machined, heat treated and ready for use.

Would service like this simplify your buying? Get in touch with us.

BUY WAR BONDS!

NORMALLY CARRIED IN STOCK

N.E. Steels and Standard S.A.E. Steels, both Carbon and Alloy, Hot Rolled and Cold Drawn

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★ Drill Rod

★ High Speed Tool Bits

★ Shim Steels

★ Tool Steels

★ Tool Steel Tubing

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ing the body of the ram and through the makeup ball valve 8 which lifts under pump suction.

As the load on the press reaches its peak, and as pressure within the cylinder builds up to a predetermined amount, a pressure switch breaks the electric circuit of a solenoid, permitting a spring inside the servo-reversing control 4 in Fig. 2 to change the control lever 5 to its reverse position. This action reverses the flow of the radial pump, causing oil to flow into the pushback or differential area of the main ram and forcing it upwards. Just prior to the development of pressure in the pushback region, the pressure of the oil in the main cylinder is released through a decompression valve not shown. Oil under pressure is now applied to the piston assembly of the surge valve, forcing it open and so permitting the escape of oil from the main cylinder into the surge tank.

On arrival of the ram at its initial or "top" position, the control lever 5 is forced to the neutral position, an action which is accomplished by the press platen striking a collar on a linkage rod connected to this control lever. Since this linkage rod collar is adjustable, it permits the press operator to determine the ram travel and thus avoid unnecessary movement.

Save for an electric supply cable, the press stands up independent and self contained, on an area which is about as small as could be imagined. No pipes, no cumbersome arrangements for prefilling the cylinder, no accumulator, no steam lines are employed.

Within recent months these presses have been applied, among other purposes, to the hot trimming of forgings. A spectacular application has been in the drawing of 105-millimeter brass cartridge cases, see STEEL, Nov. 23, 1942, p. 92.

Fig. 1 shows a 500-ton press forging part of a stern frame for a ship. The piece is approximately 18 inches square and 10 feet long—the maximum work handled by this size unit. Of course the 1000-ton size has a correspondingly larger capacity.

Turco Issues Report On Zinc Plating

A 14-page technical report on bright zinc plating as a substitute for cadmium plating, was recently issued by Turco Products Inc., Los Angeles. It covers with complete descriptions, still and barrel plating.

According to the report, the new zinc cyanide baths have a relatively high throwing power, provide a corrosion-resistant plate as effective as cadmium, and produce an attractive bright plate.

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SUPERIOR STEEL CORPORATION CARNEGIE PENNSYLVANIA

New Standard Protects Hoist, Crane Operators

To protect workers engaged in hazardous hoisting operations, the American Standards Association, 29 West Thirty-ninth street, New York, announced recently completion of a new safety code for cranes, derricks and hoists. The standard was developed by a representative committee of governmental, industrial, insurance, and technical experts, under the administrative leadership of the American Society of Mechanical Engineers and the Bureau of Yards and Docks of the United States Navy Department.

As the first comprehensive outline on a national basis of fundamental safety provisions for hoisting machinery, this work will serve as a guide not only to state and municipal authorities responsible for the guarding and inspection of such apparatus but also to industry.

The code applies to construction, installation, inspection, maintenance and operation of cranes and derricks driven by steam engines, electric motors, or internal-combustion engines; to their runways; to simple drum hoists of whatever motive power; to overhead electric hoists and their runways; to overhead air hoists; and to hand-powered derricks. It does not apply to any hoisting machine having a maximum capacity of less than one ton, nor does it apply to the temporary use of cranes, derricks, and hoists on construction work or to special equipment for mines, etc.

In addition to construction details, definitions and diagrams for each type of crane, the 90-page booklet provides for the periodic retesting of cranes and derricks and fixes safe working loads and tensile specifications for iron and steel chains with a correction table for the reduction of rated capacity of chains due to wear; it provides for that essential "human element," mentioning the need for competent and careful operators. Copies of the publication are available from association headquarters for $1.50 each.

Glass Locker Rooms Keep Workers' Clothes Dry

An air-tight room of glass block, it is reported, is being used by Rust Engineering Co., Pittsburgh, for locker rooms in order to dry workers' clothes. These special rooms, a number of which are under construction for several large manufacturers, are maintained with an air pressure above normal, it is said.

According to Rust Engineering, air is drawn through ceiling grills of the glass-enclosed room by the fan in the equip-

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ment room of the wash and locker building—it, of course, being heated in the winter.

The only escape for the air is through louvres in the bottoms of the lockers, which are of wood. Forced through these louvres by the pressure, the air is sucked up through the full interior height of the lockers into plenum chambers set on the locker tops. From here, it is vented to the outside.

The device thus provides a constant stream of air through the dampened clothes from the bottom to the top of the lockers, according to the manufacturer.

Standard on Porcelain Enameled Tanks Revised

Porcelain enameled tanks for domestic use in sizes 15 to 80-gallons inclusive for 300 pounds per square inch maximum hydrostatic test pressure are covered in the recommended commercial standard adopted by the General Conference on April 22, according to the United States Department of Commerce, National Bureau of Standards, Washington.

Purpose is to establish standard specifications and methods of test as a line of demarcation between satisfactory and unsatisfactory tanks for domestic water service, for the guidance of manufacturers, distributors, retailers and users.

Identified as TS-3488, the standard is to be prepared for distribution soon in order to obtain written acceptance.

Carpenter Publication Explains Tool Steels

A book that gives the tool maker simplified methods for selecting and heat treating steel is being offered by Carpenter Steel Co., Reading, Pa. Now in its twelfth printing, it is said to provide a plain, common sense explanation of how to make tools last longer.

Entitled "Tool Steel Simplified," the 315-page book is by Frank R. Palmer, vice president of the company. It is said to be a valuable text book for apprentice training and is equally valuable as a handbook to advance the skilled tool maker.

Throughout the publication, charts, diagrams, photographs, and tables are used to illustrate every important point. The four chapters included in the book deal with the following: Getting acquainted with tool steel; selecting the right tool steel for each kind of tool; properties, heat treatment and testing of tool steel, and things worth knowing.

Copies of the publication are being offered by Carpenter for $1 each.

Steel Manual Discusses Wrought Steel Wheels

Manufacture, wheel specifications and design, selection of wheels for railroad service, wheel trend failures and computation of stresses in wheel treads make up the subject matter of "Wrought Steel Wheels"—one of the latest steel products manuals issued by the American Iron and Steel Institute, 350 Fifth avenue, New York.

The publication, referred to as section 20, uses illustrations, graphs, tables and other devices to put the subject across to the reader.

It deals with tolerances, methods of inspection, methods of sampling and chemical analysis and other related information.

Fluid Facilitates Cleaning Of Welding Spatter

A compounded mineral oil product called No-Spat manufactured by Midland Paint & Varnish Co., Cleveland, is said to eliminate the adhesion of welding spatter on jigs treated with it during the course of welding.

According to the company, the application of the product on the welding jigs several times a day permits the spatter to be wiped off without any great difficulty.

The low surface tension of the product enables it to soak into the pores of the metal, forming a nonadherent surface, the Cleveland paint manufacturers state.

Offers Calculator To Aid Tank Designers

A new Tank calculator said to aid designers and users of ASME code pressure vessels is being offered gratis by Buffalo Tank Corp., Buffalo. It provides such information as tank diameters, required shell thickness, weight of cylindrical section, capacity, required thickness of heads, approximate weight of one head, knuckle or corner radius etc. It also lists the weights of various liquids on one side.

Man-Hours Saved by Bottle Sealing Cap

A cellulose sealing cap similar to that used for sealing medicine bottles, it is revealed, was instrumental in saving many man-hours of labor in one of General Electric's plants producing small instrument motors. It was used to mask off cylindrical surface areas of small assemblies during impregnation with insulating varnish.

The sealing material comes in form of a thin-walled tube or cap, either of which may be slipped over the work. In air-hardening, the material shrinks evenly to the point where it closes down over the surface to be masked, preventing impregnating fluids from contacting masked surface area.

Area so masked requires little or no subsequent cleaning, and as a result, a shortened production cycle is possible with a coincidental saving of man-hours, the company reports.

Newer Handbook on Aluminum Welding Offered

A new edition of the handbook on aluminum welding was recently issued by the Aluminum Co. of America, Pittsburgh.

Entitled "Welding and Brazing of Alcoa Aluminum" the new booklet incorporates in addition to methods of welding aluminum, a section of methods used in brazing the metal. Copies of the booklet are being offered gratis to anyone requesting it from the company on his own company's letterhead.

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ROLL PASS DESIGN

by Trinks (Two volumes and Supplement.)

VOL. I: (New Third Edition), 201 pages, 7 tables, 139 drawings, $5. Covers general rules and laws governing roll design in relation to sections, and principles governing entrance and deformation of bars. Elementary and advanced instruction and theory are covered.

SUPPLEMENT, $1.50, includes additional information available since publication of Vol. II. Recommended for owners of other volumes only.

VOL II, 246 pages, 21 tables, 7 charts, 176 illustrations, $6. Covers theoretical and practical reasons for the shape and size of rolls, compares different methods of rolling given sections and illustrates application of principles.

PICKLING OF IRON & STEEL

by Wallace G. Imhoff, 195 pages, 46 illustrations, $5. Various phases of pickling room practice as well as details of construction and maintenance of pickling equipment are presented. The author tells the story of surface preparation of steel for coating in a simple but practical manner discussing various steps in the process that will interest many operators in the sheet, tin, pipe, wire, strip, seamless tube, enameling, hollow ware, galvanizing and lead coating industries.

HOT DIP GALVANIZING PRACTICE

by W. H. Spowers, Jr., 189 pages, 45 illustrations, 7 folding charts, 4 tables, $4. Discusses theory of zinc coating and covers practical methods of galvanizing. Tells how to reduce dross losses. Kettle design, control of oxidation, fluxing materials, the bobbin wipe in fine wire production, chemical reactions, fluxing, flux washes and pyrometry are covered.

TOOL ROOM GRINDING

by Fred B. Jacobs, 221 pages, illustrated, $3.50. Here is a treatise that tells how grinding operations are performed to advantage in a modern tool room. Operations involved in grinding arbors, counterbores, reamers, milling cutters and precision gages as well as diemaking details and the procedure for salvaging small tools are explained in a concise manner.

THEORY & PRACTICE OF ROLLING STEEL

(Second Edition), by Tafel. 304 pages, 165 illustrations, 12 tables, $4.50. Covers roll pass design and layout of rolling mills and mill drives. Fully describes proper methods of calculation, design and wear. Pass designs for flats, skelp and squares as well as for roughing mills are considered.

OPEN HEARTH FURNACE

(Three Volumes), by Buell.—Complete set $10.
VOL. I, (New Second Edition), 276 pages, 60 tables, 69 illustrations, $4. Covers the design, construction and practice of open hearth furnaces.
VOL. II. 260 pages, 42 tables, 68 illustrations, $4. Gives the metallurgical, chemical and thermal factors of operation affecting design.
VOL. III, 308 pages, 56 tables, 114 illustrations, $4. A comparison of the ancillary systems of selected existing open-hearth furnaces and the development of basic design principles.

THE MANUFACTURE OF STEEL SHEETS

by Edward T. Lawrence, 244 pages, 116 illustrations, 9 tables, 6 x 9 inches, $4.50. Describes in detail the sequence of operations in making steel sheets on conventional type mills, from the open hearth furnace to the finished product, with special reference to high grade sheets. Influence of various methods upon quality of product and causes and elimination of defects are discussed.

INTRODUCTION TO THE STUDY OF HEAT TREATMENT OF METALLURGICAL PRODUCTS

by Albert Portevin, 246 pages, 69 illustrations, 4 tables, 6 x 9 inches, $5. Presents fundamental knowledge and essential principles of heat treatment of steel in a simple and understandable manner, without resorting to formulas.

GRINDING WHEELS & THEIR USES

by Johnson Heywood, 374 pages, 351 illustrations, 6 x 9 inches, $3. A practical book on modern grinding and polishing practice and theory. Convenient arrangement of subject matter and cross-indexing makes it valuable as a ready-reference guidebook. Includes a glossary of trade names.

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Turnstile Aids Guards

Perey Turnstile Co., 101 Park avenue, New York, is offering a new type check turnstile for plants — one that is controlled to meet the individual requirements of auditing departments, with methods to meet conditions imposed by existing needs.

A typical system, for example, operates as follows: Each employe is issued two checks with his number stamped on them. To gain admission to the plant or to leave it, each employe must deposit one of his numbered checks in a check controlled turnstile, located at the entrance. When the check is deposited, it unlocks the turnstile admitting the employe and automatically recording him on a register.

The checks are collected in a locked compartment in the turnstile. At starting time, the guard in duty at the entrance closes the passage to the turnstiles. Each employe who comes late must surrender his check to the guard, signing a slip showing his time of arrival, and entering the plant through a turnstile controlled manually by the guard. While the shift is at work, the checks are removed from the turnstiles and a record made of all employes who entered on time. Before leaving the plant each employe receives his two checks — one to be used for exit and the other for re-entrance.

Inspection of the employe's credentials, packages, lunch box, etc. can be made either before the employe reaches the check controlled turnstile, or at the turnstiles themselves. If no inspection is made at the check controlled turnstiles, one guard can readily supervise a large battery of them.

Tool Post Takes 8 Tools

Marco Co. Inc., Wilmington, Del., is now offering a new tool post built in two sizes, to accommodate six or eight tools which is said to turn an ordinary lathe into a multiple-purpose machine capable of doing work now done on turret lathes or special machines. It enables the operator to do as many as eight different operations at one setting, such as screw cutting, drilling, reaming, cutting off, threading, chamfering, forming, etc.

To perform these operations, all that is necessary is to remove the present post and insert the multi-purpose post into the same post slots. The power feed will then co-ordinate with the tool being used. After the tool post is set and bored for tools, one or two taper pins are provided to lock the cross-carriage in a central position. In this way the tool post can always be replaced in its proper position.

Steel Supply Situation Static Under CMP Control

Cut in ore tonnage may not reduce production. . . Bars, sheets most delayed. . . North African iron ore arriving as ballast. . . Freight reduction has small effect

DEMAND
New buying light.

PRODUCTION
Unchanged at 98½ per cent.

PRICES
Steady at ceilings.

LITTLE change is apparent in the general steel and iron situation, production being held at the highest practicable level in view of necessity for furnace repair, which is increasing as equipment is driven at top speed.

Cut in iron ore quota following the late season opening is not expected to hamper output greatly. Although up to this time ore shipments are about 7,000,000 tons less than at the corresponding date last year, reserves at furnaces and Lake Erie docks are equal to last year's. Several factors may cut this tonnage loss as the season advances and hope is held that more ore may be transported than in the 1942 season.

Controlled Materials Plan, now in almost complete control of the situation, is working well and essential needs are being met under its provisions. Requirements for war purposes have been covered through third quarter in some products and into fourth quarter in others, leaving little opportunity for current buying to obtain delivery promises until a late date, except when directives are used to supersede allotment numbers.

• • •

Principal stringency now is centered in bars and hot-rolled sheets. Large rounds and flats in bars are well covered into September, with that month practically sold out by some producers. In smaller sections bars can be obtained for July delivery in some instances. Hot-rolled alloy bars are available to some extent for August delivery, with heat-treated bars difficult to obtain for September shipment. Some makers have nothing to offer before fourth quarter.

Some sheetmakers are out of the market for third quarter on hot-rolled sheets. Others are able to take some business for July and August shipment. Galvanized sheets are available for July delivery by some mills. The sheet situation is causing some shifts in supply sources as customers find their usual suppliers unable to serve them.

Steelworks operations last week remained unchanged at 98½ per cent of capacity. Except for declines at Pittsburgh and Chicago the rate would have regained the level of recent weeks. Necessity for furnace repairs was the only factor preventing near-capacity production. Pittsburgh lost 1 point to 99 per cent, Chicago 2 points to 97, Wheeling 5 points to 87½ and Cincinnati 2 points to 92. St. Louis rose 3 points to 90 per cent, eastern Pennsylvania 2 points to 96, New England 5 points to 95 and Cleveland 6 points to 94 per cent. Rates were held unchanged as follows: Buffalo, 90½; Detroit, 96; Youngstown, 95; Birmingham, 100.

Proof of the high rate of steel production is found in the American Iron and Steel Institute's report of steel ingot and castings production in April, which set a new high for a 30-day month with 7,374,154 net tons. The previous high for a short month was made in November, 1942, with 7,179 812 tons. With one less day, April failed to reach the March output of 7,670,187 tons. Facilities were engaged in April at 99.3 per cent of rated capacity.

• • •

Wiremakers have practically caught up with demand for welding wire and processed electrodes, expanded capacity taking up the slack. A further increase in demand is expected when enlarged shipbuilding and airplane programs get well under way.

Some iron ore is being received at Atlantic ports from North Africa, cargoes brought by ships returning from the war area. This is largely "fines," picked up as ballast, requiring sintering before being charged to blast furnaces. Return cargoes of scrap are expected to be brought in this summer by the same means, which may prove of great assistance in providing material for next winter.

Removal of the 6 per cent freight surcharge May 15 has made slight changes in delivered prices of steel and iron products. The surcharge has been suspended until the end of the year and in the meantime the Interstate Commerce Commission is making a study of rates which may result in extension of the date or in dropping the charge altogether if it develops the carriers do not need the added revenue.

Average composite prices of steel and iron products are unchanged from levels of the past several months. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	May 15	May 8	May 1	One Month Ago Apr., 1943	Three Months Ago Feb., 1943	One Year Ago May, 1942	Five Years Ago May, 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	23.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	11.60

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	May 15, 1943	April, 1943	Feb., 1943	May, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.15	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	May 15, 1943	April, 1943	Feb., 1943	May, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.39	25.39
No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.265	26.265	26.265
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.65	140.65	140.65
Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bll.) $36.00.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10; Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.27c; New York del., 2.34c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.67c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box $4.50.
Tin Mill Black Plate, Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.29c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill, Central Iron & Steel Co. 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.27c; Phila., del., 2.215c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

	Butt Weld Steel			Butt Weld Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	56	33	¼	24	3½
¼ & ⅜	59	40½	⅜	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

	Lap Weld Steel			Lap Weld Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1⅝"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2¾"	12	17.54	20.21	16.58	26.57
3"	12	18.59	21.42	17.54	29.00
3½"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., .f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	‡‡18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.
Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.
Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices: tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	63½ off
Do., ⅝ and ¾ x 6-in. and shorter	63½ off
Do., ⅞ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

	U.S.S.	S.A.E.
Semifinished hex.	62	64
⅜-inch and less	59	60
½-1-inch	57	58
1⅛-1½-inch	56	..
1¾ and larger		

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo	2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

	Price Per Net Ton
Beehive Ovens	
Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	8.00
Wise county, furnace	7.00
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943.
†$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.53	26.03	27.53	27.03
Brooklyn, N. Y., del.	27.50	.....	.....	28.00
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	‡20.38	‖19.00	.....	.....
Baltimore, del.	25.61	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.22	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.15	.....	.....	.....
Philadelphia, del.	25.46	24.96	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.10	24.60	25.60	25.10
Muskegon, Mich., del.	27.19	.....	.....	27.19
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.75	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	25.99	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.84	25.34	.....	26.34
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

•Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. ‡For phosphorus 0.70 and over deduct 38c. ‖Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base) $29.50
6.51-7.00 ..$30.50 9.01- 9.50..$35.50
7.01-7.50 .. 31.50 9.51-10.00.. 36.50
7.51-8.00 .. 32.50 10.01-10.50.. 37.50
8.01-8.50 .. 33.50 10.51-11.00.. 38.50
8.51-9.00 .. 34.50 11.01-11.50.. 39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.34

(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. .$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. . 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base, ... 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.74, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices	
Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00
Second Quality	
Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00
Mallet's Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30
Ladle Brick (Pa., O., W. Va., Mo.)	
Dry press	$31.00
Wire cut	29.00
Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$54.00
Chem. bonded chrome	54.60
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00-28.00
Do., barge	25.00-28.00
No. 2 lump	25.00-28.00

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.33; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents up.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 16.00c; ton lots 10.50c, less ton lots, 11.00c.

Borosil: 3 to 4% boron, 40 to 45% Si., $7 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2300 series	AISI hot bars 9100 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[11]	4.715	7.762[20]	6.062[20]
New York	3.884[1]	3.778[1]	3.788[1]	5.605[1]	3.611[1]	4.005[1]	4.005[1]	5.031[13]	4.644[14]	4.134[11]	4.805	7.600[20]	5.900[20]
Jersey City	3.884[1]	3.758[1]	3.788[1]	5.605[1]	3.611[1]	4.005[1]	4.005[1]	5.031[13]	4.644[14]	4.134[11]	4.805	....	....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[13]	4.872[13]	4.072[11]	4.772	7.566[20]	5.866[20]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[13]	4.052[11]	....	....	....
Washington	3.941[1]	3.930[1]	3.769[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.041[11]	....	....	....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[11]	....	....	....
Bethlehem, Pa.*	....	3.45[1]	....	....	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[18]	4.30[20]	3.75[11]	3.52	7.35[20]	5.65[20]
Buffalo (country)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[18]	4.20[20]	3.65[11]	....	....	....
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[18]	4.00[20]	3.65[11]	....	7.45[20]	5.75[20]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.00[20]	3.65[11]	....	....	....
Cleveland (city)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[13]	4.05[24]	3.75[11]	3.20	7.55[20]	5.85[20]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[13]	3.95[24]	3.65[11]	....	....	....
Detroit	3.43[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[14]	4.30[24]	3.80[11]	3.40	7.67[20]	5.97[20]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[13]	4.77[24]	4.42[11]	....	....	....
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[13]	4.77[24]	4.42[11]	....	....	....
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[13]	4.37[24]	4.00[11]	3.45	7.60[20]	5.90[20]
Youngstown, O.*	....	....	....	....	....	....	....	4.40[13]	....	....	....	....	....
Middletown, O.*	....	....	....	....	3.25[1]	3.50[1]	3.50[1]	4.40[13]	....	....	....	....	....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[18]	4.10[24]	3.75[11]	3.50	7.35[20]	5.65[20]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[18]	4.00[24]	3.65[11]	....	....	....
Milwaukee	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[18]	4.23[24]	3.88[11]	3.54	7.33[20]	5.85[20]
St. Paul	3.75[3]	3.80[3]	3.80[3]	5.40[3]	3.50[3]	3.85[3]	3.85[3]	5.00[3]	4.35[3]	4.34[11]	3.83	7.70[20]	6.00[20]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[18]	4.24[24]	4.02[11]	3.61	7.72[20]	6.02[20]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[18]	4.25[24]	3.97[11]	....	....	....
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[18]	4.00[24]	3.97[11]	....	....	....
Memphis, Tenn.	3.90[5]	3.95[5]	3.95[4]	5.71[5]	3.85[5]	4.10[5]	4.10[5]	5.25[13]	4.66[24]	4.31[11]	....	....	....
Birmingham (city)	3.50[5]	3.55[5]	3.55[5]	5.83[5]	3.45[5]	3.70[5]	3.70[5]	4.75[18]	4.78[24]	4.43[11]	....	....	....
Birmingham (country)	3.40[5]	3.45[5]	3.45[5]	5.83[5]	3.35[5]	3.60[5]	3.60[5]	4.75[18]	4.78[24]	4.43[11]	....	....	....
New Orleans (city)	4.16[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[18]	4.95[18]	4.68[11]	5.00	....	....
New Orleans (country)	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[18]	4.95[18]	4.68[11]	....	....	....
Houston, Tex.	3.75[5]	4.25[5]	4.25[5]	5.50[5]	3.75[5]	4.30[5]	4.30[5]	5.25[18]	5.43[18]	4.50[11]	....	....	....
Los Angeles	4.35[4]	4.00[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[18]	7.15[4]	5.70[18]	....	9.55[20]	8.55[20]
San Francisco (city)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[18]	7.35[18]	5.55[18]	....	9.80[5]	8.80[5]
San Francisco (country)	3.85[7]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[18]	7.45[18]	5.45[18]	....	....	....
Tacoma	4.20[4]	4.45[5]	4.75[4]	6.50[4]	4.65[4]	4.25[5]	5.45[5]	5.70[4]	6.63[24]	5.75[18]	....	....	....
Seattle (city)	4.20[4]	4.45[5]	4.75[4]	6.50[4]	4.65[4]	4.35[5]	5.45[5]	5.70[5]	6.63[24]	5.75[18]	....	....	8.00[5]

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendments Nos. 10 and 14 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, any quantity is base.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50

less $7 freight allowance

Manganese Ore

Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	....	.....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.13-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9253	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	....	.....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	....	.....
NE 9413	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 2 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville.	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85	...	...	...	...	...	...	...	...	...	...
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

***Open Hearth Grades** refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99½% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (95-97½%) 14.75c, Grade 2 (92-95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c, Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%, Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled, carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400-lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.00c, mixed borings and turnings 6.50c, 7.50c, 8.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clippings 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 156

Stringency in hot-rolled sheets continues and in addition to two eastern producers which are out of the market for third quarter on hot-rolled sheets two others are in almost as tight a situation. Most sellers are sold up for July on hot-rolled and cold-finished sheets with backlogs for August growing rapidly. A moderate tonnage of galvanized is still available for July.

The soldup condition of some sheet mills is causing a decided shift in buying by their regular customers, who have been forced to turn to other sources in many instances, especially where heavy orders have been booked for landing mats and drum stock and have absorbed much capacity.

While there is a fair run of sheet orders no outstanding inquiries are noted. The tightening of deliveries at various mills, however, indicates substantial orders are coming from somewhere, including, undoubtedly, tonnage placed with mills direct by Washington.

While schedules are tightening, some producers can still promise shipments of both hot and cold-rolled, galvanized and certain specials in July. Fairly substantial capacity is still available in August and September.

Suspension of the freight surcharges of 6 per cent May 15 sets up delivered prices at New York at 2.34c for hot-rolled, against 2.35c; 3.39c for cold-rolled, against 3.41c; and 3.74c on galvanized, against 3.75c. The surcharges had been in effect since March 18, 1942, and the suspension will apply at least until Jan. 1, 1944.

Meanwhile, the Interstate Commerce Commission is making a study of railroad revenues, plant rehabilitation, etc. If the study is not completed by the end of this year, the suspension will be continued; or, if it appears definite that the railroads can carry on comfortably without renewing the surcharges.

Ratio of low carbon specification is heavier in current strip buying, although the volume of high carbon material requiring annealing leads, still taxing heat-treating equipment. Requirements for cartridge and shell cases are maintained, a high carbon strip taking anneals. Cold strip mills are booked up to quotas through third quarter with schedules fixed through July. Orders taken beyond that quarter are not always accompanied by allotment numbers, but are assured in practically all cases. While demand for stainless inclines to lag, other alloys, notably NE steels, are sold through third quarter and into the fourth; allocations are made where one producer is unable to handle tonnage, which is placed with another.

Bars . . .

Bar Prices, Page 156

While there is a lessening of requirements for combat tanks, gun mounts and certain other types of ordnance, the airplane industry is placing heavy tonnages for cold-drawn bars. Machine tool requirements also have been well sustained recently, although some producers see a decline later on, as machine tool builders are reducing their backlogs.

The principal stringency in bars is still to be found in large rounds and flats and special heat treated bars. No large rounds or flats appear available for delivery before August and some producers have little, if any, for that month. In fact, it would appear that most third quarter capacity on these larger specifications is now absorbed. On small and medium sizes some shipments are still being offered for July; also on hot alloy bars, although the quantity is small.

In large rounds and flats most producers are sold up to September and some have relatively little tonnage left for that month. In small and medium sizes little mill capacity is available for July and in some cases only a limited amount for August. In hot-rolled alloy bars August is about the earliest delivery promise on new business, with September the best on heat-treated bars. Some producers have nothing to offer in this line before fourth quarter.

While minor revisions have been made in production programs, demand and overall consumption of hot carbon, alloy and cold-drawn bars in New England tends to mount. Requirements of forge shops are heavy, bolstered by new contracts for a wide range of forged hand tools for the services, placed with several Connecticut manufacturers. For civilian needs restrictions on forged hand tools are largely offset by frequent large inquiries from service procurement offices. Aircraft, shipyards, forged link chain, marine hardware, arsenals, bolts and nuts are accounting for large tonnages and forward buying into fourth quarter is more active. Cold-drawn and hot-rolled alloys are sold up to August delivery

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with numerous producers; some bar mills are below capacity, due to a lack of semifinished steel, diverted to other products, notably plates One large producer of hot carbon bars frequently lacks steel to maintain full operations and is rolling alloys for other mills, partially filling gaps and tending to relieve the tight alloy position. While subcontracting has subsided in some directions, there is still a good demand for automatic screw machine capacity, notably on work three-inches and under. Machine tool requirements have slackened, but the reverse is true of shops consuming tool and die stock.

Plates . . .

Plate Prices, Page 157

Plate sellers report little tonnage from consumers for July delivery. Jobber orders came through promptly under the special arrangements which now prevail and some specifications are being received against long-term contracts, especially from shipbuilders. On the whole much business for that delivery remains to be placed. Some observers attribute the present lull largely to force of habit of buyers. Under the allocation system consumers not infrequently waited until the end of the month to place orders, when applications had to be in for tonnage to be rolled in the second following month. This arrangement no longer prevails, with all new business now under CMP and requiring allotment numbers. Yet the mid-month lull persists and July tonnage is coming through slowly.

Plate demand is being well sustained, with shipyards, fabricators, and warehouses, respectively, the leading buyers. However, there has been an increasing drop in the quantity of flanged work, due primarily to decline in the fabrication of fuel oil tanks. The suspension of freight surcharges May 15 has resulted in a decline in the delivered, New York, price from 2.30c to 2.29c.

While engineers have finished plans in most cases for new work in connection with the synthetic rubber program, there still is uncertainty as to when the latest phase of the program will go ahead and also as to whether it will be carried out to the extent anticipated only a few weeks ago. This uncertainty is attributed to the recent controversy in Washington as to the relative importance of the synthetic rubber and high-test gasoline programs. This controversy has also made for uncertainty with respect to further work in the construction of high octane gasoline units. However, some trade interests look for important work to get under way by mid-summer.

Wire . . .

Wire Prices, Page 157

Wire mills are sold through third quarter on some specialties and orders are in for various items for shipment early next year. Considerable forward buying has developed under CMP, although firm specifications covering sizes and other details are lacking for much of this advance tonnage. For this reason, producers tend delay on definitely entering some of this volume. Scattered specialty tonnage is frequently allocated, including brush wire wanted for July. While in general deliveries have not improved, at least one eastern mill is slightly easier on intermediate sizes of plain basic wire with some capacity for late June delivery. Much specialty tonnage requires up to three anneals. Heavy demand holds for music and oil tempered wire for springs, with considerable range in ability of producers to ship. Specialty tonnage tends to be concentrated in fewer but larger individual orders. Capacity engaged in filling rope mill needs is at peak with rope plants covering into fourth quarter.

Expanded capacity for production of welding wire and the processing of electrodes has brought output about equal to current heavy demand but a further increase in requirements of 25 to 30 per cent is expected, to meet growing programs, notably in shipbuilding and aircraft. Fully 90 per cent of the wire is coated, most of it heavily, and the pinch prevailing several months ago, which forced larger use of bare wire, is largely eliminated for the moment. Expected increase in demand is likely to be met by new equipment expected to enter production soon. Tightness in coated electrodes, which had existed for a year and a half, has eased, although requirements are heavier. Bessemer stock is being used for more purposes than normally and deliveries are about as extended as on open-hearth basic wire.

Demand for wire nails ebbs and flows, sustained pressure for tonnage having eased somewhat. While the services are allowed most barbed wire output, some limitations have been removed on agricultural needs, also on five additional tpes of heavy fencing. The extent this extended allowance given the farm trade will be

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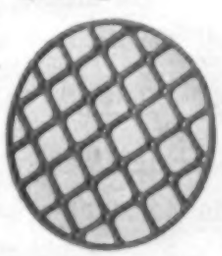

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Heat-Resistant and
Corrosion-Resistant
ALLOY CASTINGS

met depends on the tonnage of semi-finished allocated finishing mills and machines.

Structural Shapes . . .

Structural Shape Prices, Page 157

In sharp contrast to the tight situation in bars and sheets deliveries on structural shapes still can be had during the current quarter. Not much capacity is available before July 1 but mills are able to accept a moderate tonnage. In general the shape situation is easier than a month ago, as mill backlogs have shrunk.

In the absence of construction demand, structural fabricating shop operations continue to undergo marked changes in the nature of work, which is reflected in their steel requirements. Less shape tonnage is needed, numerous fabricators consuming more sheets and plates than usual. Most demand is for bar-size shapes, structural angles, channels and light material; broad flanged and heavier sections are not moving. Shipyards and warehouses are taking most of the current output of structural mills, with fair tonnage going to miscellaneous manufacturing consumers. A large proportion of shape tonnage is fabricated by welding.

Many fabricators are operating under subcontracts, notably on ship assemblies; ships are constantly requiring new deck equipment, stowage racks, gun mounts, ladders and miscellaneous apparatus. Some structural shops which got into ship work early are busier than in peacetime while others need volume. There has been no decline in subcontracting by shipyards but most of them are farming out more. An eastern navy procurement office has quotations on a large tonnage of steel and aluminum gratings. Scores of hemp mills are being contracted for in various sections, but are designed for a minimum of steel, none in the framework.

Rails, Cars . . .

Track Material Prices, Page 157

While car inquiry is light, a heavy list of locomotives for export is pending; also an inquiry for ten 2-6-6-6 Mallet type is pending for the Chesapeake & Ohio. Meanwhile the War Production Board has approved an order for ten 2-10-4 type steam locomotives placed a few weeks ago by Bessemer & Lake Erie with Baldwin Locomotive Works. Car inquiry is understood to include fifty 50-ton hopper cars for the Ann Arbor.

Defense Plant Corp. has awarded 400 kitchen cars to American Car & Foundry Co., to be used by the War Department in troop trains. Office of Defense Transportation has approved allocations of materials for these and for 1200 troop sleepers recently placed with Pullman Standard Car Mfg. Co.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 157

Bids were opened at Chicago May 12 on one of the largest tonnages of concrete bars that the trade has seen in many weeks—625 tons for superstructures for the City of Chicago's South district filtration plant. Otherwise, there is no new inquiry, and little is in sight for the immediate future. Awards, likewise, have been insignificant, and involve small tonnages.

Pig Iron . . .

Pig Iron Prices, Page 158

While applications for June shipments of pig iron show little change in point of tonnage, there is no question that order backlogs at some foundries continue to shrink. Unless new war contracts are booked shortly, these foundries will reach the end of their order book in several instances and this will be reflected in subsequent applications for iron. In certain instances operations are less active than a month ago, due to suspensions from machine tool builders who have accumulated a heavier inventory of castings than they can immediately work off. This situation was reflected in applications for June pig iron, although it appears that increases in requests elsewhere sustained total volume fairly well.

Malleable iron requirements are maintained, most shops melting at capacity. The sold-up position of the industry is indicated by attempts of an eastern contractor to sublet several thousand malleable castings, averaging five pounds each, on an eight weeks delivery basis; the best promise was 12 weeks and some shops ranged up to one year.

Allocations of basic are steady, but overall requirements for gray iron foundries are slackening. With some of the latter shops recent requests for iron were considered excessive and have been pared down, inventories taken into considera-

Turnings getting in your hair?

then it's time to investigate the

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Chips, borings and turnings can be a terrific nuisance in any shop where automatic screw machines, lathes and planers, etc., pile up daily heaps of metal refuse. This waste byproduct is too valuable to throw away and too bulky to store. The problem is solved by the American Ring Turnings Crusher. This crusher utilizes the famous rolling ring principle of crushing, quickly and economically reducing bulky turnings of low or high carbon steel, alloy steel or brass into "Chips". American Ring Turning Crushers are built in various sizes; we will study your requirements, and recommend the proper size crusher for your particular needs.

ORIGINATORS OF THE ROLLING RING CRUSHING PRINCIPLE

Rear View
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tion with slower operations. Some gray iron foundries have around 45 days reserve, most of them nearer 30. With some exceptions producers of castings for the machine tool industry are less active. Foundries supplying shipbuilders are well supplied with orders, with substantial backlogs while allocations to steel foundries are sufficient to maintain them near capacity.

Two blast furnace stacks are ready to be blown in within a few days in the Buffalo district. Hanna Furnace Corp. has a relined stack ready to resume and the new Defense Plant Corp. furnace at the Lackawana plant of Bethlehem Steel Co. is also ready. The latter stack was to have been blown in a fortnight ago but late opening of navigation caused a delay until the ore situation was cleared.

Scrap . . .

Scrap Prices, Page 160

While demand for foundry grades of scrap in New England continues light, open-hearth material of better quality is readily sold, although steel works have as much as two months reserves in some instances. Heavy melting steel, including No. 1 bundles now delivered to mills, is of better grade than some scrap included in inventory. Not all bundles, notably No. 2, are being taken by melters in the district, but find a market in other areas, some by allocation. The long stressed campaign for improved segregation of alloy turnings at points of production is bearing some fruit in that area and movement is slightly heavier, but finding a market for the heavy output of machine shop, bushy and other turnings remains a problem, although blast furnaces are taking their share of these and stove plate.

Open-hearth scrap is moving in fair volume from the New York-New Jersey area to Pennsylvania melters, mainly by purchase, with allocations fewer, especially to points requiring long hauls. Movement of scrap to Buffalo by barge has started but is limited by shortages of barges. Steel scrap is more active than cast grades, foundries having substantial stocks and some eastern shops are melting much less than was the case some months ago.

Late opening of navigation at Buffalo has caused delay in receiving cargoes of scrap from the head of the lakes, which had been allocated to Buffalo consumers. As a result shipments have been allocated from other areas to support Buffalo operation. Considerable scrap accumulated through the winter at Lake Superior ports is relied on to end the shortage as soon as it can be moved.

Melters in the St. Louis district are receiving enough tonnage to support high steel production and quality is better. Yard labor shortage is holding down preparation or supply would be larger. Tin can collection is smaller, attributed to food rationing.

In the eastern Pennsylvania district yard scrap is moving slowly, with suspensions still in effect at some mills on turnings and bundled scrap and at two on all grades except heavy breakable. The latter is in general demand but various foundries also are still holding up shipments. While some suspensions have been attributed to a desire to await the freight reduction of May 15 the general trade is of the opinion that the saving was not sufficient to have been much of a factor.

Means Sought To Limit Alloy Losses in Scrap

More attention is being given to the problem of alloy turnings and reports

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten Types

(For each 1% tungsten contained)

Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.60
Do., 5 to 12%	1.40
Turnings, millings, solids under 5%	1.25

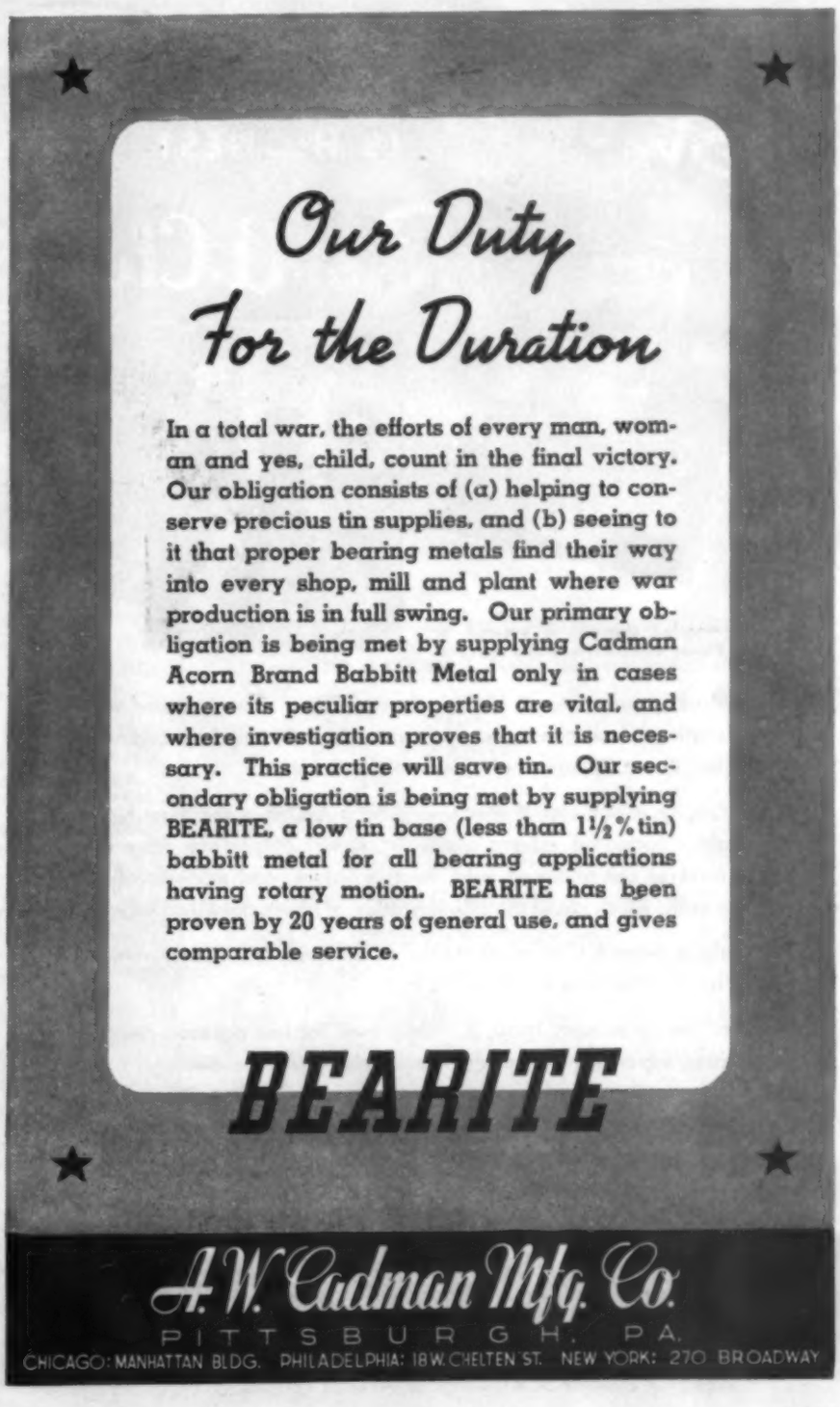
Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 1% vanadium	13.50
Turnings, millings, same basis	11.50

Mixed Scrap

(Molybdenum and Tungsten Types)

Solid scrap, each 1% contained tungsten	1.60
Solid scrap, each 1% molybdenum	.80
Millings, turnings each 1% tungsten	1.40
Millings, turnings, each 1% molybdenum	.70

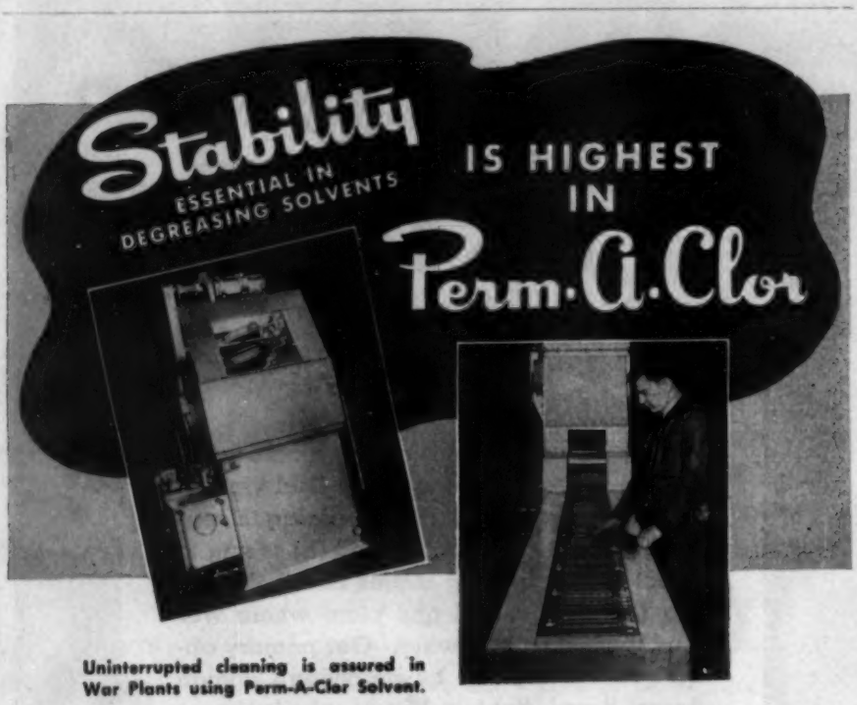

Our Duty
For the Duration
In a total war, the efforts of every man, woman and yes, child, count in the final victory. Our obligation consists of (a) helping to conserve precious tin supplies, and (b) seeing to it that proper bearing metals find their way into every shop, mill and plant where war production is in full swing. Our primary obligation is being met by supplying Cadman Acorn Brand Babbitt Metal only in cases where its peculiar properties are vital, and where investigation proves that it is necessary. This practice will save tin. Our secondary obligation is being met by supplying BEARITE, a low tin base (less than 1½% tin) babbitt metal for all bearing applications having rotary motion. BEARITE has been proven by 20 years of general use, and gives comparable service.
BEARITE
A. W. Cadman Mfg. Co.
PITTSBURGH, PA.
CHICAGO: MANHATTAN BLDG. PHILADELPHIA: 18 W. CHELTEN ST. NEW YORK: 270 BROADWAY

on conditions in the alloy steel industry, indicate a gradual increasing shortage of these critical steels. An authoritative estimate indicates that of the total production of alloy steel, which is now about 1,200,000 tons per month, about 18 per cent is converted into turnings. About 39 per cent comes back in the form of solid scrap in one form or another, both as ingot crops and similar heavy scrap within the steel producing units themselves and as heavy scrap from fabricating operations. According to a recent statement by WPB authorities, nearly 50 per cent of the alloy steel scrap is not finding its way back into the electric furnace. A large proportion of this 50 per cent is undoubtedly turnings.

There is increasing pressure within the industry for segregation on the part of consumers, which would result in uniform analysis turnings being available for remelting. This matter has progressed so far that an order requiring this is in preparation and is expected soon. The proposed order would make it mandatory for any alloy steel fabricator to segregate scrap according to its alloy content.

Counter proposals have been made by certain quarters that a premium be paid for scrap which has been properly segregated, but factors within the scrap industry feel that this is not the answer. Scrap dealers are not equipped in most cases to handle a large number of different types of turnings because of the narrow margin on which most scrap yard operators are now operating and they are in no position to construct facilities for this purpose. For that reason a large percentage of the scrap industry is attempting to stay clear of the turnings picture, which further aggravates the situation.

The fact that there is a fairly good flow of carbon steel scrap and a ready market for it makes it unprofitable for a dealer to attempt to market turnings unless he can do so on the basis of alloy content without additional expense for handling.



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The difficulties encountered in the use of ordinary solvents under varying operating conditions were overcome when Detroit Rex Engineers originated the stabilization of chlorinated solvents.

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Not only is Perm-A-Clor more stable as a liquid, but it also remains stable as a vapor and condensate.

Another Detrex solvent, Triad, is widely used for less rigorous cleaning operations, especially where only steel parts are to be cleaned. It has the same excellent cleaning qualities of Perm-A-Clor but differs in the kind and amount of stabilizer. You can choose the Detrex solvent suited to your particular cleaning operations.

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Warehouse . . .

Warehouse Prices, Page 159

Warehouse steel demand is well sustained and in most cases tonnage is in excess of the average for the past year. Structural tonnage is less but this is more than balanced by demand for bars and sheets, which are difficult to obtain from mills.

Mill quotas to warehouses are being fulfilled and stocks show improvement. Operations under the Controlled Materials Plan are complicated by heat treated alloys being cut off. Due to broken assortment in many lines consumers in many cases are being supplied from excess inventory through WPB.

Warehouses find themselves in a more comfortable position than they have been for months, due to better receipts from mills, nevertheless they still are unable to satisfy more than one-fourth of the items listed on customers' inquiries because inventories are not balanced. New business remains fairly even. Tightest of all products are bars, in carbon, alloy and cold-finished grades. Plates in the lighter thicknesses are available in sufficient amounts, but heavy sizes are difficult to obtain. NE steels also are markedly out of balance and incoming supplies are soon moved out.

Iron Ore . . .

Iron Ore Prices, Page 159

While not large in the normal sense, a fair aggregate tonnage of iron ore is being received at North Atlantic ports from North Africa. Brought in convoy ships in lots said to average possibly 1500 tons or so, the ore is mostly "fines", which has to be sintered and which is picked up primarily as ballast, with quality of secondary consideration.

In fact, these shipments, it is pointed out, in no way run counter to the broad agreement of a few months ago between this country and England, whereby the latter was to receive the rich North African iron ores and the United States the manganese and cobalt, once North Africa was cleared of Axis domination.

With the Allies' North African campaign now drawing to a successful conclusion, it is believed that England will receive substantial quantities of this high grade North African iron ore over coming months. Also England, as pointed out in a recent issue, stands to benefit materially by the movement of high grade phosphate rock from North Africa, which she for some time past has been receiving from the United States.

The iron ore "fines" now arriving are being used principally by seaboard consumers, who are said to be working it in with the eastern local ores and ores

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Triple-Chip METHOD OF COLD SAWING METAL
DOES More WORK Faster!

Good, clean, accurate work, too—the only kind you can afford to do for Uncle Sam or anybody else. Clean cutting without chatter, without burrs, without scrap. Production up to 1-1/2 times previous highs. Two machines (No. 3 and No. 4) handle round stock up to 16", squares to 14-1/2"; single or multiple cutting of practically any metal, ferrous or nonferrous. Only Motch & Merryweather builds all 3: cold saw, blade, and blade sharpener. Bulletin.

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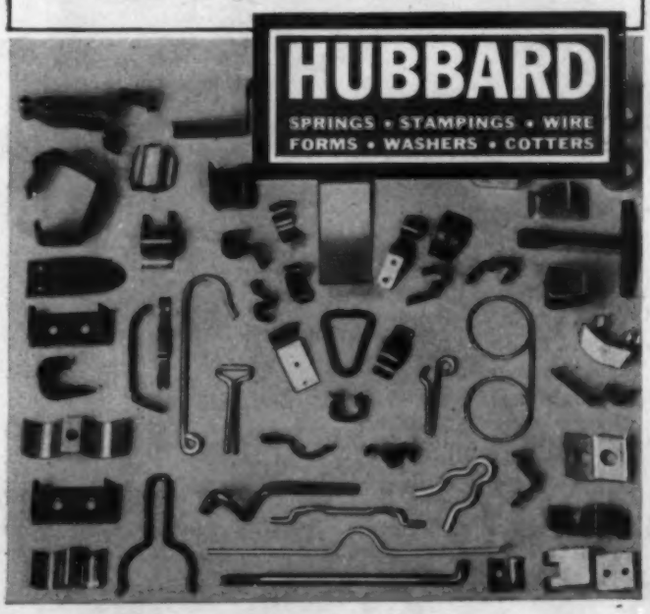

FAMOUS BUM GUESSERS

(2)

Benito (IL DROOPY) *Mussolini*

He guessed he'd hitch his wagon to the Axis star, then just sit back and enjoy the ride . . . Some *ride, eh Benny old kid?*

The good way for *you* to avoid bum guesses is just to stick to Penola lubricants. *MORE* Penola greases serve the steel industry than any other kind. *EVERY* Penola lubricant carries an ex*tra* margin of safety over actual operating need.

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LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

from the Lake Superior region.

Recently two cargoes of low grade ore from North Africa, running around 5000 tons each were purchased by an eastern consumer, who will "sweeten" it with ores mined in this country.

So far little scrap has reached this country from North Africa; however, it is believed that the scrap shipments will pick up materially over the next few months.

Nonferrous Metals . . .

Nonferrous Prices, Page 161

New York—Allocations of copper for June delivery, now in process, involve an overall tonnage about equal to recent months. Interest now centers in revisions to individual fabricators.

Some fabricators were allowed to increase inventory in May, allocations to brass and wire mills exceeding applications in some instances. This is likely to be extended to others for June.

Distribution of the available supply within the total tonnage allocated varies constantly based on inventories, fabricating schedules and the importance of delivery of products during the month covered by allotments. Fabricators are generally quoting deliveries as specified or within 30 days on open bids. Distribution within the total allotment is largely done by co-operation between producers and consumers, the former making some notable contributions toward the elimination of cross-hauling.

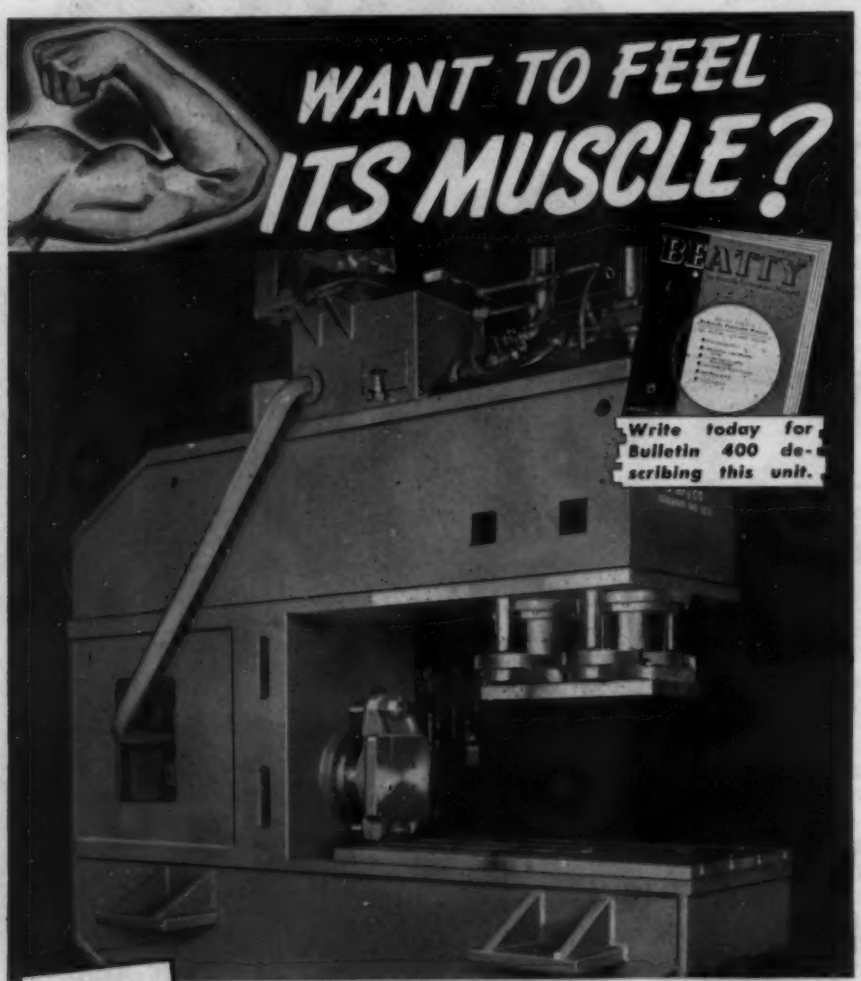
While the Metals Reserve Co.'s reserve supply is called on to round out requirements each month after domestic refinery copper is exhausted for the period, material taken from the pile is promptly replaced and the reserve is maintained.

Among new orders restricting the use of copper is limitation order L-12, saving an estimated 600,000 pounds by elimination of the metal, also copper-base alloy and zinc in the manufacture of plumbing fixture fittings as trim.

More copper base alloy scrap, notably brass, is emanating from war operations, and becoming more of a factor in allocations. There is a heavy demand for brass cartridge cups and shell casings. While steel is also fabricated for these in greater volume, the latter augments brass, rather than reducing the total tonnage used.

Both in primary and fabricated form, 98,500 tons of idle and excessive copper have been allocated for war production through the War Production Board's copper recovery program. Approximately 50,000 tons so far reported under the program remain to be distributed, but 18,000 tons are in assembled products containing other materials which make it unsuitable for copper scrap; the balance is being moved by the Copper Recovery Corp.

High grade zinc is somewhat easier, due in part to stepped up production by one producer and restrictions on the use of that grade. Requirements of galvanizers are held to available supply of steel for coating. Slab zinc prices, delivered New York, with the cancelled six per cent freight are: prime western, 8.6517c per pound; brass special, 8.9017c; and intermediate, 9.1517c.



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HYDRAULIC HEAVY METAL WORKING EQUIPMENT

BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA

MRC Raises Prices of Beryl, Tantalite-Columbite Ores

Metals Reserve Co. has arranged to purchase domestic beryl and tantalite-columbite ores in both large and small lots. This program is designed to stimulate domestic production of these materials and to afford producers a ready market.

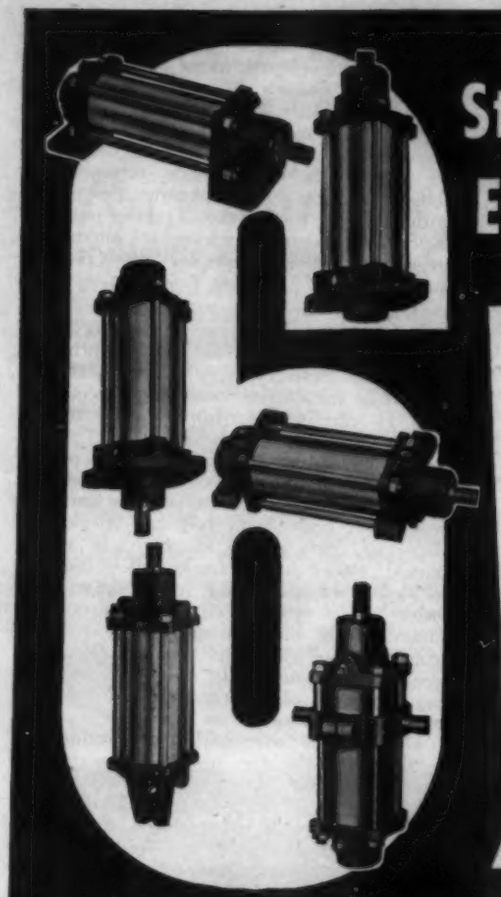
Metals Reserve Co. will purchase domestic beryl ore on the basis of $120 per dry net ton for 10 per cent BeO grade ore, adjusted pro rata, which represents a substantial increase over the price of $83.30 per dry net ton previously paid. The price schedule adopted for domestic tantalite ore has also been increased so that the producer will receive approximately 50 cents per pound of contained tantalic oxide (Ta_2O_5) over the former price.

Steel in Europe . . .

London—(*By Radio*)—Heavy demand is experienced in Great Britain for alloy steel for armaments and planes and deliveries are lengthening steadily. Light foundries are more active and heavy engineering works are fully occupied well into the future.

Canada . . .

Toronto, Ont.—New order placing in the Canadian steel markets has increased in volume during the past week or ten days. Mill representatives state



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TOOL engineers . . . plant superintendents . . . production men . . . find that the application of air or fluid power to machine movements, lifting, clamping and positioning operations, is greatly simplified when NOPAK Cylinders are specified.

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Write for Illustrated Bulletin 82-A

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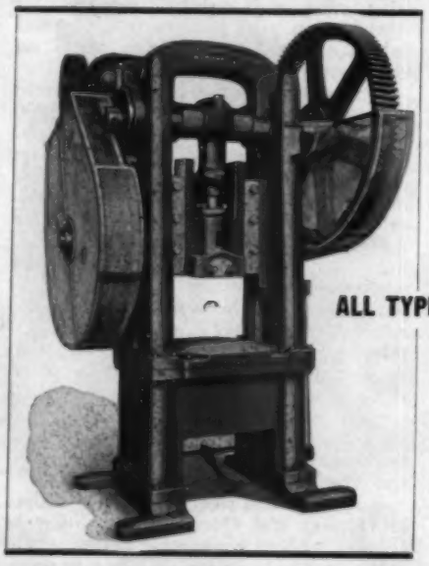

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NEW **GOVERNMENT "SPECS" for ALLOY STEELS**

Revised Frasse Data Chart Now Available

Incorporating all recent corrections and additions, this new Frasse Data Chart enables you to identify latest Government "specs" for alloy steels at a glance.

It shows the chemical analysis requirements for each Army, Navy, and Federal specification, together with its nearest commercial equivalent in SAE, AISI, and AMS numbers. Government "specs" for the new NE steels are included.

The chart is handy file size, printed on tough stock, and suitable for wall or desk use. If you're working to Government "specs", you'll find it invaluable. Just send in the coupon—a copy will be sent you by return mail.

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COLD FINISHED BARS · ALLOY STEELS · STAINLESS STEELS AND TUBING
COLD ROLLED STRIP AND SHEETS · WELDED STEEL TUBING · DRILL ROD

that second quarter booking is in excess of production and most recent sales have been for delivery in third quarter. Producers' books are filled to the end of September on some products and mills are refusing additional business. Reports from the Department of Munitions and Supply that the Canadian war production program soon is to undergo radical changes and that employes in a number of plants may face temporary holidays pending re-tooling for the swing-over has so far not resulted in curtailment in orders for steel and other metals. Just what line the change-over will take has not been made public, other than that special attention will be given to increased output of ships and aircraft, while some guns and ammunition will be curtailed. It also is stated that one or two new types of guns are soon to be turned out in Canadian plants, and tooling is now proceeding for this purpose.

Heavy demand for plates persists and while most of the new business is through the steel controller's department for quick delivery, a large part of recent orders has been for delivery in three to six months. It is stated that about 75 per cent of plate backlogs are directly associated with the shipbuilding program, the remainder covering such important activities as rolling stock, marine boilers and a few other essentials. However, available tonnages are under strict control and deliveries are being made to meet all requirements of essential war consumers on schedule.

Demand for black and galvanized sheets has developed more action with new buying from a diversified group of consumers. Mills, however, are almost fully booked to the end of June and while additional orders are being taken no promise is being made regarding delivery. There has been some slowing in demand for the synthetic rubber plant at Sarnia recently, which is making larger supplies available for other consumers.

Merchant bar sales rose during the past few days and some tightening in supply is reported. Mills are accepting orders for delivery into third quarter and while they have some output available in carbon bars for delivery this quarter most of it is being held in reserve against orders from the steel controller. Demand for alloy bars exceeds output and a large part of current business is for delivery in July and August. However, no actual shortage is reported, either in carbon or alloy bars, as deliveries are being made in such order as to provide all essential consumers with some inventory. Inquiry from civilian users has been more active recently and while mills are booking this type of business they are not promising delivery.

Demand for wire and wire products is slow, chiefly due to limited supply and restrictions placed on use by the steel controller. Slowing in building trades has greatly reduced consumption of nails and there also has been sharp falling off in wire consumption in farm communities. Against reduced demand, mill representatives state that production is at the lowest point in years, owing to shortage of wire rods.

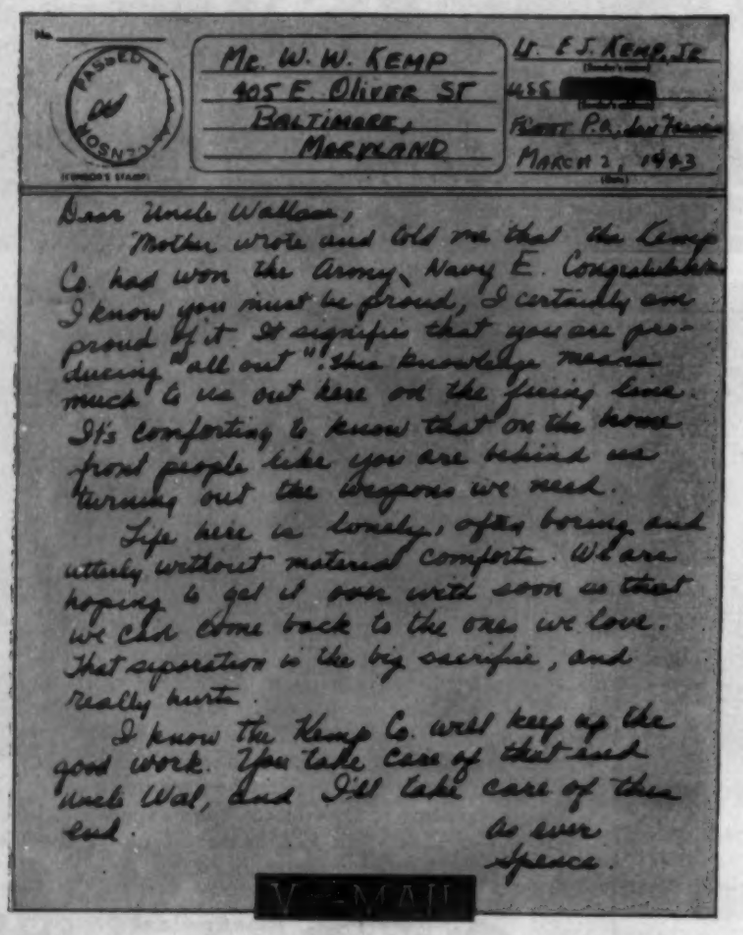
According to recent information makers of wrought pipe are now looking for buyers. Labor shortage and curtailment in new works construction using pipe had reduced demand for wrought iron pipe to a mere trickle and makers are said to have fair stocks on hand, with no customers.

Merchant pig iron sales have showed some improvement, totaling about 8000 tons, about 5000 tons malleable and 3000 tons foundry iron. Basic iron sales were featureless. Some melters are now placing orders to the end of the quarter and others are issuing inquiries extending into the middle of third quarter. However, under steel controller regulations melters are not permitted to place long term forward delivery contracts. Steel Co. of Canada Ltd. again entered the market recently after an absence of several months and has been filling iron requirements of a few customers. Canadian Furnace Co. and Algoma Steel Corp. are still providing merchant iron to melters in Ontario and Quebec.

Scrap iron and steel receipts by dealers in Ontario and Quebec are gaining in volume, with corresponding betterment in deliveries to consumers. While most scrap received by dealers in the Toronto district is from local sources, some dealers state that they are now obtaining fair tonnages from outside points. Dealers are adding to yard accumulations, and state that incoming scrap is in excess of handling capacity. While salvage drives have started in some rural communities only minor tonnages have yet appeared from this source.

Despite better offerings of cast scrap and stove plate, there is still a serious

Friends of Kemp, both old and new, will be interested in this V Mail from the Front Line: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MARCH 2, 1943
Dear Uncle William,
Mother wrote and told me that the Kemp Co. had won the Army Navy E. Congratulations I know you must be proud, I certainly am proud of it. It signifies that you are producing "all out"! This knowledge means much to us out here on the fighting line. It's comforting to know that on the home front people like you are behind us turning out the weapons we need.
Life here is lonely, often boring and utterly without material comforts. We are hoping to get it over with soon so that we can come back to the ones we love. That separation is the big sacrifice, and really hurts.
I know the Kemp Co. will keep up the good work. You take care of that end Uncle Wal, and I'll take care of this end.
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It's easy to use this efficient Welding Table for all sorts of job-shop work. And standardized repeat operations are faster and better the LYON way, too. This unit makes experienced welders more efficient—helps newly trained operators do reliable work. Safe, sure foot-pedal *Hydraulic* elevating and lowering gives you swift, just-right positioning. Pivots on full circle with 15° indexed positions. 2000 lbs. capacity . . . no ratchets or gears. Write today for prices on this fine LYON unit! Ask for Bulletin No. 131.

LYON HYDRAULIC WELDING POSITIONER

Tilts Hydraulically
—as well as lifts and revolves!

Step up your "production welding" with this LYON Positioner! . . . in many cases as much as 50%. It elevates a full 14"—revolves a full 360°—and tilts a full 90°. Get full information on this advanced-type positioner—Bulletin No. 131.

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...ALDRICH *Inverted*

VERTICAL TRIPLEX HIGH PRESSURE PUMP *for...*

- Pipe Line Service
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Fluid end located at top of pump frame. Totally enclosed with provision for outside packing and proper lubrication under all operating conditions. Crankshaft extends through crankcase for direct coupling at floor level to gear motor or speed reducer. For pressures to 8350 p. s. i. and capacities to 200 g. p. m. Ask for Data Sheet 66.

THE ALDRICH PUMP COMPANY

2 GORDON STREET • ALLENTOWN • PENNA.

MOTORIZED PLANETARY REDUCER

Horizontal drive, made in 35 sizes in ratios of 10 to 1200:1 and from ¾ to 75 horsepower.

D.O.JAMES MOTORIZED SPEED REDUCERS

MOTORIZED HELICAL REDUCER

Horizontal drive—made in 13 sizes in ratios of 1¼ to 9¼:1 and from ¾ to 50 horsepower.

ARMY E NAVY

MOTORIZED WORM GEAR REDUCER

Horizontal drive—made in 11 sizes in ratios of 6 to 80:1 and from ⅛ to 50 horsepower.

SAVE ESSENTIAL AND VALUABLE SPACE

War time requirements make the D.O.James Motorized Reducers a very important Must in solving and meeting the power-saving needs of modern industry. Their accessibility and compactness make them most desirable when floor space is limited. Their soundness of design and manufacture insures maximum efficiency with minimum maintenance.

D.O.JAMES MANUFACTURING CO.

Established 1888

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MAKERS OF ALL TYPES OF GEARS AND GEAR REDUCERS

shortage of these materials, and it is stated that efforts are pending regarding increased imports from the United States. The 10 per cent war exchange tax on cast iron scrap imported into Canada was suspended May 5, and it is expected that this will enable larger imports from across the line without increasing ceiling prices of finished products.

Equipment . . .

Boston—Revisions in the urgency list pertaining to machine tool deliveries are for the moment diverting more units to aircraft engine plants, notably one in New Jersey. Rated as No. 2 on shipments up to recently, with several other aircraft branches rating higher, including propellers, machine tool deliveries have been raised in importance for engine construction to bring new plants up to production on schedule. This results in revised schedules for assembly and delivery with numerous shops holding machinery contracts for aircraft plants; orders for the new engine capacity were placed sometime back.

Meanwhile builders of more standard tools are steadily reducing backlogs, with shipments well in excess of new orders. Shops producing specialty units have not improved deliveries to the same extent as those building standard tools; a Worcester, Mass., shop building special lines of grinders is quoting October shipment on some tools. There are other tight spots, including automatic screw machines in several sizes, but the overall position of the industry is becoming easier.

Lathe manufacturers are promising 90 days; some milling machine builders have about caught up on backlogs and are working on current orders. For the most part this is not entirely true of shops in this district; most have several months backlog which is being reduced at a more rapid rate. This is accompanied by a curtailment in subcontracting. Gradually more machine builders are seeking contracts for production of material outside regular lines and some experimental orders are in the works.

New York—Machine tool shipments tend slightly lower, gradually reflecting the decline in orders which developed months ago and reduced backlogs. The backlog volume maintained shipments near the peak until early this quarter. With some builders greatly improved delivery is the result, notably on milling machines, lathes and the more standard tools. On some sizes of milling machines shipment is possible in 30 days.

The supply situation has improved, especially in ordinary steels used by the industry, but limitations on other vital parts continue a production problem. No direct-current totally enclosed motors are allowed to be used without special permits; standard open type alternating current units are specified. There are also delays in some types and sizes of bearings. With the greatly expanded industrial plant for war largely tooled, the matter of contract renegotiation, pressure discounts are commanding serious attention. In probably no industry would unsound and uneconomic renegotiation have a more devastating impact than on machine tools in view of excess postwar capacity and over-tooling for war production.

Castolin Eutectic

LOW TEMPERATURE WELDING

NO RISK OF BURNING IN JOINING LIGHT TO HEAVY GAUGE

PROBLEM

To join the thin bronze mesh of these oil tank hose strainers to the thick brass frame without overheating and burning the mesh. With high temperature fusion welding such damage was prevalent. As a result vital metal and man-hours were needlessly wasted on a great number of the units produced.

SOLUTION

With Castolin Eutectic Low Temperature Welding Alloy No. 180 these strainers are being turned out in but a fraction of the time with no waste of vital metal through overheating damage. Castolin Eutectic Alloy No. 180 binds at 1290°F . . . *gives stronger, smoother, color matching joints requiring no after-machining.*

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SOLE MANUFACTURER - CASTOLIN EUTECTIC WELDING ALLOYS

40 WORTH STREET, NEW YORK, N.Y

NEW FACILITIES . . .

Defense Plant Corp. authorized recently the following plant expansion and equipment purchases:

Aerojet Engineering Corp., Pasadena, Calif., equipment for plant in California costing $60,000.

Arnolt Motor Co., Warsaw, Ind., equipment for plant in Indiana costing $85,000.

Commodity Credit Corp., Washington, facilities for two plants in Minnesota costing $350,000 each.

Domestic Manganese & Development Co., Butte, Mont., facilities in Montana costing $250,000.

Aero Spark Plug Co. Inc., New York, plant equipment in New York, overall commitment of $85,000.

American Export Airlines Inc., New York city, facilities in the state costing $130,000, overall commitment exceeding $1,000,000.

American Type Foundries Inc., Elizabeth, N. J., additional plant facilities in New Jersey costing $155,000, overall commitment of $675,000.

Clearing Machine Corp., Chicago, additional plant facilities in Illinois costing $215,000, overall commitment of $575,000.

Coast Carbons Inc., Tacoma, Wash., additional plant equipment in Washington, overall commitment of $225,000.

Curtiss-Wright Corp., Buffalo, N. Y., additional plant equipment in Missouri costing $230,000, overall commitment of $24,000,000.

Cutter Laboratories Inc., Berkeley, Calif., additional plant facilities in California costing $75,000, overall commitment of $200,000.

Wyman-Gordon Co., Worcester, Mass., additional plant facilities in Illinois costing $1,400,000, overall commitment of $12,300,000.

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In America's vast war production program Strom steps up its untiring energies to the mastery of one thing. For over a quarter century Strom has concentrated on Metal Balls. Today, through a series of lapping operations, Strom Balls possess a degree of surface smoothness and sphericity that is unequalled in any other regular grade of ball.

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Industrial

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The STA-KOOL Single-Point Tool is equipped with internal coolant ducts and external cooling fins to quickly dissipate the heat, thus prolonging tool life.

SMITITE Diamond Dressing Tools employ a sintered metal setting, which firmly holds the stones till they are completely consumed. Catalogs on request.

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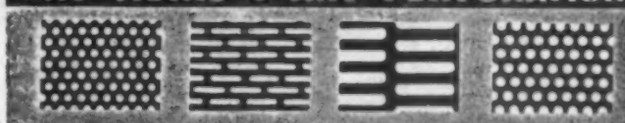

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NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Minneapolis Office, Contract Distribution Branch of WPB, 304 Midland Bank building, is seeking contractors for the following:

No. S-423: Hydraulic pump parts. A number of parts, 500 to 1000 of each, probably larger quantities later. Early delivery. Bronze and gray iron castings and forgings furnished by prime contractor. Tolerance, .0002. Operations are machining, grinding, milling and lapping.

No. S-443: Vibration damper assembly. Facilities required include large engine lathes and internal and external grinders. Quantity, 1200, plus spare parts; 150 monthly minimum. Tolerance .002. Forgings furnished. Segments to be flame cut from discs furnished. Negotiated, with breakdown to show hourly rates and tooling costs.

No. S-444: Diesel engine parts. A number of parts, 250 to 4000 of each. Require machining, grinding, milling, lapping. Tolerance, .0005. Materials SAE 3140, 1112, etc. Requires hand screw machines, turret lathes to 3½ inches, external and internal grinders.

No. S-445: Bolts. Quantity, 40,000, ⅝ x 6 inches, forged, hexagon head, plated. Operations are machining, threading, grinding, plating. Delivery early and urgent. Material, AMS 6415 (nickel-chromium-molybdenum steel, approx. SAE 4340). Priority, AA-1.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-18-22336: A New Jersey manufacturer seeks a subcontractor with gear cutting facilities, to make gears. Equipment, spiral and bevel cutting machines, gear grinding and gear lapping machines, engine and turret lathes and horizontal broaching machine. Material, AMS 2640 and SAE 2330. Tolerance, .002. Dimensions, 1 to 4 inches. Quantity, 1000 per month. Prints available.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building reports the following subcontract opportunities:

Buescher-18-1: A Pennsylvania concern requires facilities for taper boring hub and cutting keyway in eight rudder crossheads for steering gear. Requirements, first forging available by August 1, then one every two months until completion. Equipment required, 12-foot boring mill, 2-foot 9-inch bar travel; hydraulic slotter, 32¼-inch stroke. Material, steel forging, navy specification 49S2, furnished by prime contractor. Tolerance, taper bore, .003; keyway, .001. Overall dimensions, four feet eight inches wide, two feet nine inches deep and ten feet long. Prints at Philadelphia office.

Buescher-18-2: A Pennsylvania concern requires facilities for machining ram assembly for steering gear. Requirements, first forging available by August 1, then one every two months until completion. Equipment, planer, 4 x 18-foot bed, 38 inches under head; engine lathe 18 inches between centers, to swing 44 inches; hydraulic slotter, 30-inch stroke; horizontal boring mill, 3-inch bar, 30-inch table travel. Material, steel forgings, navy specifications 46S4 INT, to be furnished by prime contractor. Prints at Philadelphia office.

Buescher-18-3: A Pennsylvania corporation requires facilities for machining stainless taper pins for detachable links, 24 sizes, 1000 of each. Material, type 416 steel, (Carpenter free machining or equivalent.) Dimensions, lengths from 1⅛-inch to 13 inches. Small end from .208 to 1.250-inch. Taper ¼-inch per foot or .0208-inch per inch of length. Prints at Philadelphia office.

Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:

Job No. 6156: Coupling nut. Quantity, 25,000. Material, aluminum alloy or nickel steel, which is furnished. Equipment, automatic screw machine, tapper, sensitive drill. Dimensions, ⅝-inch hex x 43/64-inch long. Tolerance, plus .003.

Job No. 6163: Nut. Quantity, 25,000. Material, aluminum alloy, furnished. Equipment automatic screw machine, lead screw tapper, anodizing. Dimensions, ⅞-inch hex x 37/64-inch long. Tolerance, plus or minus .0013.

Job No. 6165: Hose coupling body. Quantity, 25,000. Materials, aluminum alloy, furnished in June. Equipment, automatic screw machine, anodizing. Dimensions, ⅞-inch hex x 1⅛-inch long. Tolerance, plus or minus .0025.

Job No. 6167: Hose coupling body. Quantity, 25,000. Material, aluminum alloy, which is furnished. Equipment, automatic screw machine, lead screw tapper, heat treatment, anodizing. Dimensions, ⅝-inch hex x 1¼-inch long. Tolerance, plus or minus .0025.

Job No. 6169: Hose coupling. Quantity, 25,000. Material, aluminum alloy, which is furnished. Equipment, automatic screw machine, H.D. drill, anodizing. Dimensions, 1⅛-inch O.D. x 1⅝-inch long. Tolerance, .0025.

Job No. 6171: Hose coupling. Quantity, 25,000. Material, aluminum alloy, furnished. Equipment, automatic and hand screw machine. Dimensions, 43/64-inch, O.D. x 2 5/32-inch long. Tolerance, plus or minus .0028.

Job No. 6245: Ship fender cores. Quantity, 10,000, at 223 per day. Material steel, furnished. Equipment, punch press for ⅝-inch stock or cutting torch, sensitive drill press, blacksmith shop, arc welder, punch press, hot galvanizing. Dimensions, 32 inches long.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-94: Precision ground taps and small thread and plug gages. Manufacturer wanted who can take on additional work for quick deliveries. Various sizes. Rating, AA-1. Reference, 1-A-962.

Chicago office, Contract Distribution Branch of WPB, 226 West Jackson Boulevard, is seeking contractors for the following:

Barcalo Mfg. Co., Buffalo, N. Y., attention A. W. Kirton or G. N. Abt. Priority, AA-1. Requires 1600 to 2000-pound drop hammer forging facilities for manufacture of open-end and box-end wrenches. Contractor will furnish materials. Quantity, 500,000. Material, alloy steel.

Cherry-Burrell Corp., 427 West Randolph street, attention M. G. Brand. Priority, AA-1. Job covers machining 9000 per month of a relief valve. Subcontractor to make necessary fixtures. Contractor supplies stampings ready for machining. Material, monel metal. Equipment, bench lathe, 7 x 15-inch turret.

Farrell Mfg. Co., Joliet, Ill., attention P. H. Hoefer. Priority, AA-1. Fillister head machine screw. Quantity, 25,000 at 2000 per month. Material, cold-rolled steel. Contractor will assist in obtaining material. Equipment, ⅝-inch capacity single-spindle automatic screw machine, plain No. 1 horizontal milling machine, zinc plating and normalizing equipment.

Fruehauf Trailer Co., 10940 Harper avenue, Chicago, attention Edwin D. McGee. Priority, AA-1. Slack adjuster worm. Monthly requirements 20,000. Continuous requirements during 1943. Material, alloy steel, supplied by contractor. Dimensions, 1 x 3¼ inches. Equipment, 1-inch capacity four-spindle automatic screw machine, plain No. 1 horizontal milling machine, 5/16-inch dr. capacity two-spindle bench drill, 6 x 12-inch disc cutter thread mill, zinc plating equipment.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

3200 tons, airplane plant in eastern Pennsylvania for the Murray Corp., Detroit, placed with Bethlehem Steel Co., Bethlehem, Pa., through Esslinger-Misch Co., contractors.

SHAPE CONTRACTS PENDING

375 tons, continuous I-beam bridge, Delaware county, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 14.

REINFORCING BARS . . .

REINFORCING STEEL PLACED

150 tons, Associated Refineries, Shawnee, Okla., to Sheffield Steel Corp., Kansas City, Mo.

100 tons, hangars, United States Army, Oklahoma City, Okla., to Capitol Steel & Iron Co., Oklahoma City, Okla.

REINFORCING STEEL PENDING

625 tons, superstructures, low-lift pumping station and chemical building, South district filtration plant, department of public works, City of Chicago; S. N. Nielsen Co., Chicago, low bidder; bids May 12.

175 tons, I-beam bridge, Delaware county,

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Pennsylvania; bids to state highway department, Harrisburg, Pa., May 14.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Bessemer & Lake Erie, ten 2-10-4 type locomotives noted recently as being placed with Baldwin Locomotive Works, Eddystone, Pa.; approved by WPB.

LOCOMOTIVES PENDING

Chesapeake & Ohio ten 2-6-6-6 Mallet type locomotives; bids asked.

CONSTRUCTION AND ENTERPRISE

OHIO

CLEVELAND—Wellman Bronze & Aluminum Co., 6017 Superior avenue, will build storage building, one-story, 30 by 63 feet. H. G. Slatmyer & Son Co. are contractors.

CLEVELAND—Harris-Seybold-Potter Co. will construct boiler house building, 150 x 100 feet, at 4510 East Seventy-first street. Gillmore-Carmichael-Olsen Co., contractor.

CLEVELAND—Leece Neville Co., B. M. Leece, president, 3363 Hamilton avenue, will expand production facilities with a one-story factory addition to cost $10,000.

CLEVELAND—Cleveland Steel & Pipe Co. has been newly incorporated by Ezra A. Shapiro, Samuel K. Walzer and Leo M. Ascherman, N. B. C. building, who is also statutory agent.

CLEVELAND — Marquette Metal Products, Herbert Glaitz, president, will erect storage building at 1145 Galewood drive, to cost $8,000.

CLEVELAND—Ace Gauges Inc., Clarence Snyder, agent, 801 N.B.C. building, is being incorporated by David Shapiro and Evelyn L. Zettelmeyer, to manufacture gages and precision instruments of all kinds.

CLEVELAND—Enamel Products Co., George C. Johnson, president, 341 Eddy road, is erecting a one-story storage building.

CONNECTICUT

ANSONIA, CONN.—Hershey Metal Products Co., Hawkins street, Derby, will build two-story, 40 x 100-foot brick, steel and concrete factory addition, Division street, to cost $45,000. L. P. Caproni, 1221 Chapel street, New Haven, Conn., engineer.

NEW HAVEN, CONN.—New Haven Malleable Iron Co., C. M. Brennan, president, 385 Clinton avenue, will rebuild 70 x 250-foot foundry addition and 40 x 70-foot annealing plant, brick, steel, Clinton avenue, to cost over $40,000. Leo F. Caproni, 1221 Chapel street, engineer.

DANIELSON, CONN.—V. La Rosa & Sons Inc., Dyer street, will build boiler plant. Leo F. Caproni, 1221 Chapel street, New Haven, Conn., engineer.

NEW YORK

FALCONER, N. Y.—Jamestown Sterling Co. Inc. has awarded contract to Scalisi Bros., 66 Merlin avenue for construction of one-story, brick and concrete plant addition, Allen street. Estimated cost is over $40,000. (Noted Feb. 15.)

NEW JERSEY

UNION, N. J.—Elastic Stop Nut Corp. has leased the former plant of the Suburban Mill Work Supply Co., Spring and Essex streets, Milburn, N. J., for assembly operations and storage. Building will supply 16,000 square feet of additional space.

MICHIGAN

DEARBORN, MICH. — Bennett & Straight, architects, Schaefer building, are preparing plans for construction of tool and die shop and addition to office building to be located in Dearborn. Owner and location temporarily withheld.

DETROIT—Sterling Dockson Co., 3839 Wabash avenue, has been incorporated with $25,000 to deal in welding and safety equipment. Correspondent, Chas. H. Dickson, 1525 Balmoral.

DETROIT—American Automatic Heating Co., 703 Griswold building, has been incorporated with $10,000 to deal in stokers, etc. Correspondent, Tillie Rosen, 703 Griswold building.

DETROIT—Bromley Research & Development Corp., Frank T. Bromley, 4612 Woodward avenue, has been incorporated to deal in machinery; 1000 shares, no par value.

JACKSON, MICH.—G & S Iron & Metal Co., 317 Water street, has been incorporated with $25,000 to deal in scrap iron, metals, etc. Correspondent, Louis Glick, 612 South Bowen street.

MT. CLEMENS, MICH.—Michigan Standard

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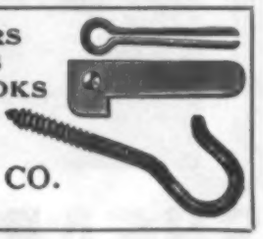
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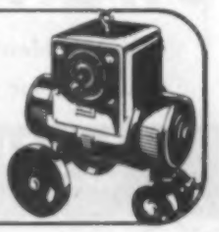
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Production Co., James Elder, 4205 North Gratiot avenue, has been incorporated with $25,000 to deal in machine parts, tools, etc.

MUSKEGON, MICH.—Barton Iron Recovery Inc., Harry B. Berman, 1604 Jefferson street, has been incorporated with $12,500 to deal in scrap iron.

ILLINOIS

GALESBURG, ILL.—Water Works Department, D. Lindberg, mayor, City Hall, plan extensions including well, pump, elevated tank and distribution mains, to cost $150,000. Stanley Engineering Co., Muscatine, Iowa, engineer.

EAST MOLINE, ILL.—City of East Moline has awarded contract for water works pumping station and pipe lines to J. D. Hunzinger Construction Co., Security building, Davenport, Iowa, at $18,886.

ROCK ISLAND, ILL.—J. I. Case Co., 700 State street, Racine, Wis., has awarded electrical contract in connection with alterations to its factory to Leithner & Weishar, 418 Sixteenth street. Addition will cost $200,000.

INDIANA

KOKOMO, IND.—Kokomo Sanitary Pottery Co., F. A. Walsh, manager, North Main street, has plans completed by B. A. Conn, 20 West Jackson boulevard, Chicago, to rebuild 90 x 300-foot, 50 x 651-foot and 30 x 30-foot brick, concrete and steel factory buildings, all one story, to cost $100,000. J. R. Marsh, 1710 South Macedonia avenue, Muncie, Indiana, engineer.

MARYLAND

BALTIMORE—Maryland Bolt & Nut Co., Mt. Washington, Ga., plan alteration and plant addition to cost $14,800. W. E. Bickerton Construction Co., 101 West Twenty-second street, Baltimore, contractor.

GEORGIA

ATLANTA, GA.—Southern Railway, care of chief engineer, Washington, let contract to Brice Building Co., 215 South Eighteenth street, Birmingham, Ala., for construction of diesel engine building, to cost $65,000.

COBB COUNTY, GA.—U. S. Engineers' office, 512 Spring street, N. W., Atlanta, let contract to Flagler Co., 305 Techwood drive, N. W., Atlanta, for construction of gunnery building for Marietta Aircraft Assembly Plant.

TENNESSEE

MEMPHIS, TENN.—Ford Motor Co. will manufacture Pratt & Whitney airplane engine parts in its Memphis plant; will install new machinery. P. A. Boykin in charge of local plant.

NORTH CAROLINA

HAZELWOOD—Dayton Rubber Co. plans factory addition, steel, concrete foundation, to cost $175,000. Geyer & Neuffer, 437 Ludlow Arcade, Dayton, O., engineers and architects.

MISSOURI

ST. LOUIS—St. Louis Car Co., 8000 North Broadway, will erect warehouse to cost about $40,000. C. W. Clawson Co., architect. Owner builds.

OKLAHOMA

OKLAHOMA CITY, OKLA.—Midwest Steel Co., Norman Bird, president, 12 North Indiana, plan to rebuild warehouse, shop and office.

WISCONSIN

FOND DU LAC, WIS.—Wells Mfg. Corp., 194 West Division street, has awarded contract for construction of three-story, 28 x 100-foot factory addition to Immel-Mabie Co., 101 South Main street. F. J. Stepnoski & Son, 194 South Main street, architects. (Noted March 15.)

TEXAS

EDINBURG, TEX.—McBride Refining Co. will construct gasoline refinery to cost $125,000.

IOWA

CEDAR RAPIDS, IOWA—Wilson & Co. have awarded contract for construction of five-story, 95 x 150-foot cooler building to Sumner S. Sollitt Co., 307 North Michigan avenue, Chicago.

CALIFORNIA

BEVERLY HILLS, CALIF.—Aircraft Engineering Inc. will erect factory addition at 335 North Foothill boulevard, 117 x 74 feet, to cost $16,000.

BURBANK, CALIF.—Lockheed Aircraft Corp. will construct modification plant No. 5 at 4201 Empire avenue, 160 x 320 feet, to cost $150,000.

LOS ANGELES, CALIF.—Production Tool Products Co. is firm name under which Paul V. Hildebrand and R. J. Beller have published intention to conduct business at 815 North Cahuenga boulevard.

LOS ANGELES, CALIF.—Kaiser-Hughes Co. will construct new factory buildings at 11900 Florence avenue, Baldwin Hills, Los Angeles, Calif., to cost $1,345,000.

LOS ANGELES, CALIF.—Timm Aircraft Co. will construct assembly building at 8055 Woodley avenue, 86 x 40 feet, to cost $2500.

LOS ANGELES, CALIF.—Aircraft Tools Inc., 530 Gage avenue, will build machine shop at 6435 McKinley avenue, 53 x 105 feet, to cost $7,000.

SAN FRANCISCO—Navy Department of Yards & Docks, Eighteenth street and Constitution avenue, N. W., Washington, has awarded contract to Pennsylvania Iron & Steel Co., 2451 East Twenty-third street, Los Angeles, for 120-ton floating stiffleg, derrick, NOY. 5949, to cost $192,960.

SANTA MARIA, CALIF.—Union Oil Co., Union Oil building, Los Angeles, has awarded contract to Fluor Corp., P. O. Box 7030, East Los Angeles, for gasoline absorption plant, to cost approximately $500,000.

CANADA

ESSEX, ONT.—Wasco Valve Seat Co., Gordon street, has had plans prepared and will build plant addition under supervision of own staff, estimated to cost, with equipment, about $20,000.

HAMILTON, ONT.—Irvington Varnish & Insulator Co. of Canada Ltd., Burlington street east, has given general contract to W. H. Cooper Construction Co. Ltd., 306 Medical Arts building, for construction of plant addition to cost about $20,000. Prack & Prack, Pigott building, are architects.

KITCHENER, ONT.—Four Wheel Drive Auto Co. Ltd., 103 York street, has had plans prepared and will let contract soon for construction of plant addition estimated to cost, with equipment, about $15,000.

OSHAWA, ONT.—General Motors of Canada Ltd., Division street, W. R. Roberts, general manager, has had plans prepared for addition and repairs to plant to cost about $12,000.

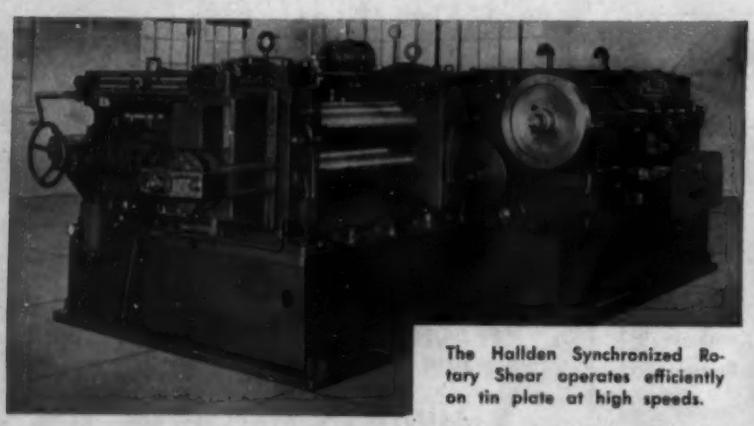
TORONTO, ONT.—John Inglis Co. Ltd., 14 Strachan avenue, has given general contract to A. W. Robertson Ltd., 57 Bloor street west, for further addition to Colt gun plant to cost, with equipment, about $25,000. Allward & Gouinlock Ltd., 57 Bloor street west, are architects.

TORONTO, ONT.—Dominion Bridge Co. Ltd., 1139 Shaw street, has given general contract to Anglin-Norcross, Ontario, Ltd., 57 Bloor street west, for addition to electrical shop, etc., to cost, with equipment, about $20,000.

WELLAND, ONT.—Page Hersey Tubes Ltd., 100 Church street, Toronto, has given general contract to Dickie Construction Co. Ltd., 17 Yorkville avenue, Toronto, for further addition to its plant here to cost about $17,000. Margison & Babcock, 210 Dundas street west, Toronto, consulting engineers.

ARVIDA, QUE.—Aluminum Co. of Canada Ltd., Sun Life building, Montreal, has given general contract to Foundation Co. of Canada Ltd., 1538 Sherbrooke street west, Montreal, for construction of addition to plant here to cost with equipment, about $45,000.

MONTREAL, QUE.—Canadian Liquid Air Co. Ltd., 1111 Beaver Hall Hill, has completed plans and will proceed with construction of plant additions at Viau and Rouen streets, to cost about $17,000.



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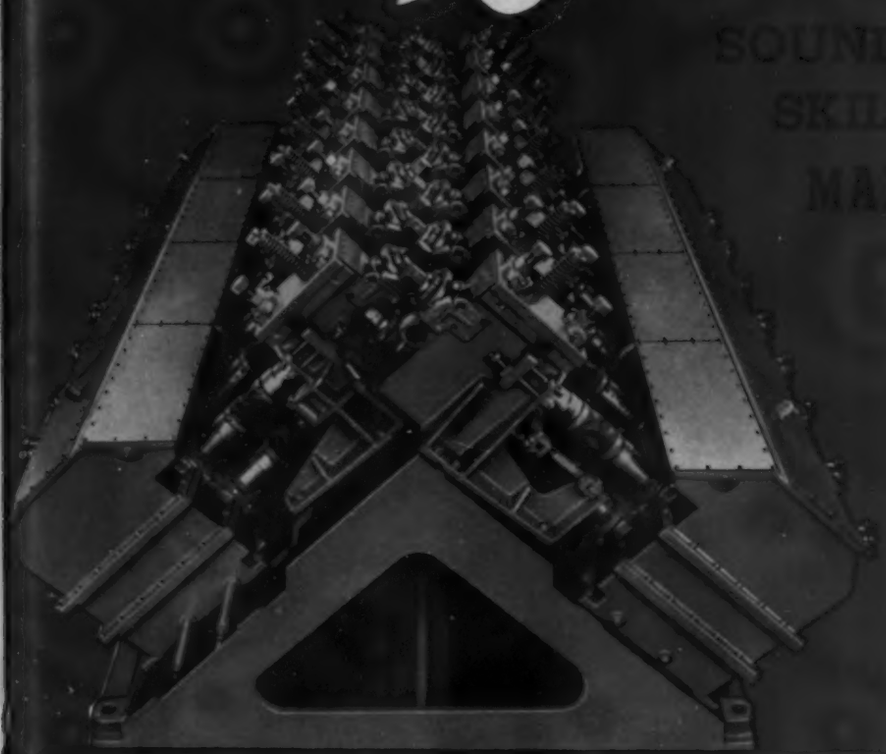

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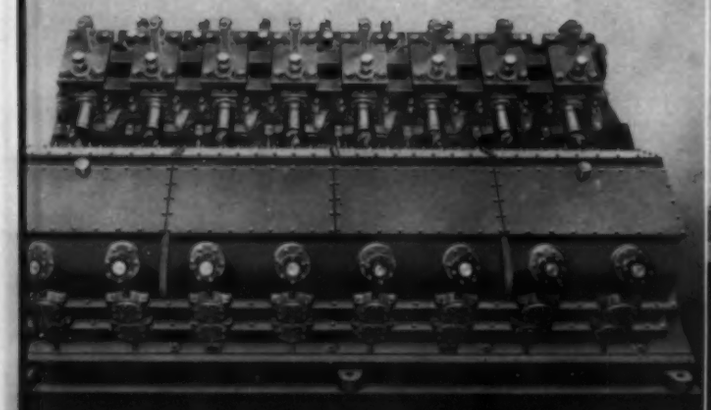

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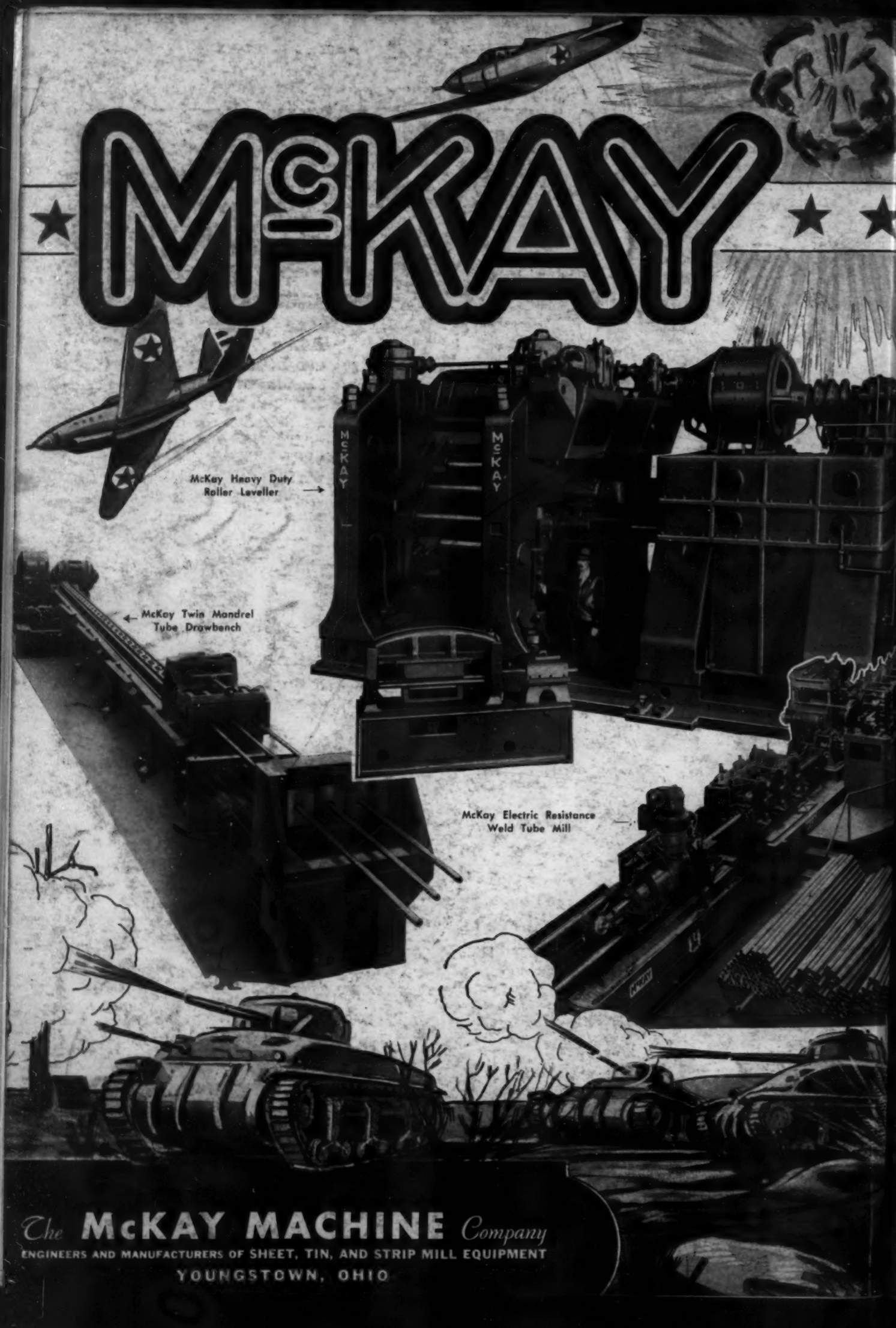
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